INCH – POUND
ATPD-2372
10 May 2007

PURCHASE DESCRIPTION

MEDIUM MINE PROTECTED VEHICLE (MMPV)

1. SCOPE

1.1 Scope. This document covers the performance and system requirements of a complete motorized, wheeled, blast protected vehicle that is designed for force protection and system survivability. The MMPV shall be a vehicle that is highly mobile, protected from the specified threats, has a crew-served weapons mount, capable of mounting and powering communications and counter electronic warfare equipment, and capable of transporting the specified payload.

2. APPLICABLE DOCUMENTS

2.1 General. The documents listed in this section are cited in sections 3 and 4 of this specification. This section does not include documents cited in other sections of the specification or recommended for additional information or as examples. While every effort has been made to ensure the completeness of this list, document users are cautioned that they must meet all specified requirements in the documents cited in sections 3 and 4 of this specification, whether or not they are listed.

2.2 Government documents

2.2.1 Specifications and standards. The following documents, in effect on the date of the solicitation (unless otherwise specified), form a part of this document to the extent specified herein.

FEDERAL

A-A-50271	–	Plate, Identification
A-A-52426	–	Hose and Hose Assemblies, Non-Metallic, Silicone, Polyester and Wire Reinforced
A-A-52507	–	Tire Chain Assembly and Cross Chain, For Military Vehicles
A-A-52550	–	Pintle Assembly, Towing, Manual Release
A-A-52624	–	Antifreeze, Multi-Engine Type
A-A-59592	–	Can, Fuel, Military: 20-Liter Capacity
FED-STD-595	–	Colors Used in Government Procurement

DEPARTMENT OF DEFENSE

MIL-STD-130	–	Identification Marking of U.S. Military Property
MIL-STD-188-125-2	–	High-Altitude Electromagnetic Pulse (HEMP) Protection for Ground Based C4I Facilities Performing Critical, Time-Urgent Missions - Part 2 - Transportable Systems
MIL-STD-209	–	Interface Standard for Lifting and Tiedown Provisions
MIL-STD-461	–	Requirements for the Control of Electromagnetic Interference Characteristics of Subsystems and Equipment
MIL-STD-464	–	Electromagnetic Environmental Effects Requirements for Systems

DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited.

Beneficial comments, suggestions, or questions on this document should be addressed to U.S. Army Tank-Automotive and Armaments Command, AMSRD-TAR-E / SC #268, 6501 E. 11 Mile Road, Warren, MI 48397-5000 or emailed to standardization@tacom.army.mil.

MIL-STD-810	–	Environmental Engineering Considerations and Laboratory Tests
MIL-STD-882	–	Standard Practice for System Safety
MIL-STD-1179	–	Lamp, Reflectors and Signaling Equipment for Military Vehicles
MIL-STD-1180	–	Safety Standards for Military Ground Vehicles
MIL-STD-1275	–	Characteristics for 24 Volt DC Electrical Systems in Military Vehicles
MIL-STD-1332	–	Tactical, Prime, Precise, and Utility Terminologies for Classification of the DOD Mobile Electric Power Engine Generator Set Family
MIL-STD-1366	–	Interface Standards for Transportability Criteria
MIL-STD-1472	–	Human Engineering
MIL-STD-1474	–	Noise Limits
MIL-PRF-2104	–	Lubricating Oil, Internal Combustion Engine, Combat/Tactical Service
MIL-STD-2169	–	High Altitude Electromagnetic Pulse Environment
MIL-DTL-5624	–	Turbine Fuel, Aviation, Grades JP-4 and JP-5
MIL-PRF-11021	–	Switch, Vehicular Lights: 24 Volt DC
MIL-DTL-22992	–	Connectors, Plugs and Receptacles, Electrical, Waterproof, Quick Disconnect, Heavy Duty Type, General Specification For
MIL-DTL-53072	–	Chemical Agent Resistance Coating (CARC) System Application Procedures and Quality Control Inspection
MIL-PRF-62048	–	Air Cleaners, Automotive: Heavy Duty, Dry-Type
MIL-DTL-83133E	–	Turbine Fuels, Aviation, Kerosene Types, NATO F-34 (JP-8), NATO F-35, and JP-8+100
MS-75020	–	Connector, Plug, Electrical-12 Contact, Intervehicular, 28 Volt
TOP 2-2-508	–	Automotive Safety and Health Hazard Evaluation
TOP 2-2-601	–	Acceleration; Maximum and Minimum Speeds
TOP 2-2-607	–	Cooling Systems (Automotive)
TOP 2-2-608	–	Braking, Wheeled Vehicles
TOP 2-2-610	–	Gradeability and Side Slope Performance

(Unless otherwise indicated, copies of federal and military specifications, standards, and handbooks are available from the Standardization Documents Order Desk, Building 4D, 700 Robbins, Philadelphia, PA 19111-5094 or at http://assist.daps.dla.mil/online/start/).

2.2.2 Other Government documents, drawings, and publications. The following other Government documents, drawings, and publications, in effect on the date of the solicitation (unless otherwise specified), form a part of this document to the extent specified herein.

HANDBOOK - DEPARTMENT OF DEFENSE

MIL-HDBK-419	–	Grounding, Bonding, and Shielding for Electronic Equipment & Facilities
MIL-HDBK-454	–	Guideline, Safety Design Criteria – Personnel Hazards
MIL-HDBK-759	–	Human Engineering Design Guidelines
MIL-HDBK-1791	–	Designing for Internal Aerial Delivery in Fixed Wing Aircraft

INSTRUCTION - DEPARTMENT OF DEFENSE

DoDI 6055.11	–	Protection of DoD Personnel from Exposure to Radiofrequency Radiation and Military Exempt Lasers

CODE OF FEDERAL REGULATIONS (CFR)

29 CFR Occupational Safety and Health Standard (OSHA)
40 CFR Protection of Environment – EPA
49 CFR Transportation: Department of Transportation – FMSCR and FMVSS

U.S. Army TACOM

12422122	–	Stencils
12322663	–	Towbar, Motor Vehicle
12422685	–	Digitalization Rack, FMTV
13229E8014	–	Rifle Mounting Bracket
13229E8016	–	Rifle Mounting Bracket
ATPD 2352	–	Purchase Specification, Transparent Armor

ARMY REGULATIONS

AR 750-1	–	Army Materiel Maintenance Policy
AR 70-38	–	Research, Development, Test and Evaluation of Materiel for Extreme Climatic Conditions
DA PAM 25-30	–	Consolidated Index of Army Publications & Blank Forms

(Unless otherwise indicated, copies of the above documents and drawings are available from the Superintendent of Documents, U.S. Government Printing Office, 732 N. Capitol Street, NW, Washington, DC 20401, or at www.access.gpo.gov).

2.3 Non-Government publications. The following publications in effect on the date of solicitation (unless otherwise specified) form a part of this document to the extent specified herein.

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ASQC Z1.4	–	Sampling Procedures and Tables for Inspection by Attributes
AWS D1.1	–	Structural Welding Code – Steel
AWS D1.2	–	Structural Welding Code – Aluminum
Z535.1	–	Safety Color Code
Z535.3	–	Criteria for Safety Symbols

(Application for copies should be addressed to the American National Standards Institute, Inc., 1430 Broadway, New York, NY 10018, or at http://www.ansi.org/).

ASSOCIATION OF AMERICAN RAILROADS (AAR)

General Rules Governing the Loading of Commodities on Open-Top Cars

(Application for copies should be addressed to IRF, 525 School St., Washington, D.C. 20024, or to www.aar.org/).

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION

ISO 12103-1 A1	–	Road vehicles; Test Dust for Filter Evaluation, Part 1: Arizona Test Dust

(Application for copies should be addressed to Case postale 56 CH-1211 Geneva 20, Switzerland, or www.iso.org/).

NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA)

NEMA Z535.2	–	Environmental and Facility Safety Signs

(Application for copies should be addressed to the National Electrical Manufacturers Association, 1300 N. 17th Street, Suite 1847, Rosslyn, VA 22209, or www.nema.org/).

NORTH ATLANTIC TREATY ORGANIZATION (NATO)

AEP 5	–	NATO Standard Engine Laboratory Tests
STANAG 2010	–	Military Load Classification Markings
STANAG 2021	–	Military Computation of Bridge, Ferry, Raft, and Vehicle Classifications
STANAG 4007	–	Electrical Connectors between Prime Movers, Trailers and Towed Artillery
STANAG 4074	–	Auxiliary Power Unit Connections for Starting Tactical Land Vehicles
STANAG 4381	–	Blackout Lighting Systems for Tactical Land Vehicles
STANAG 4145	–	Nuclear Survivability Criteria for Armed Forces Materiel and Installations (AEP-4)
STANAG 4478	–	Emergency Towing and Recovery Facilities for Tactical Land Vehicles
STANAG 4521	–	Nuclear, Biological, and Chemical (NBC) Defense Factors in the Design, Testing and Acceptance of Military Equipment (AEP-7)

(NOTE: Application for copies of this STANAG should be addressed to Etat-Major de la Force, Terrestre, GSPR OPS TRG, Quartier Reine Elisabeth, Evere, Brussels, Belgique, or www.nato.int/).

SOCIETY OF AUTOMOTIVE ENGINEERS (SAE)

SAE J10	–	Air Brake Reservoir Performance and Identification Requirements
SAE J115	–	Safety Signs
SAE J163	–	Low Tension Wiring and Cable Terminals and Splice Clips
SAE J198	–	Windshield Wiper Systems, Trucks, Buses, and Multipurpose Vehicles
SAE J318	–	Automotive Air Brake Line Couplers (Gladhands)
SAE J336	–	Sound Level for Truck Cab Interior
SAE J366	–	Exterior Sound Level for Heavy Trucks and Buses
SAE J537	–	Storage Batteries
SAE J578	–	Color specification
SAE J591	–	Spot Lamps
SAE J645	–	Automotive Transmission Terminology
SAE J680	–	Location and Operation of Instruments and Controls in Motor Truck Cabs, Recommended Practice
SAE J682	–	Rear Wheel Splash and Stone Throw Protection
SAE J695	–	Turning Ability and Off Tracking – Motor Vehicles
SAE J704	–	Truck Transmission Mounted Power Take-Offs
SAE J706	–	Rating of Winches
SAE J753	–	Maintenance Interval Chart
SAE J994	–	Alarm – Backup – Electric Performance Testing
SAE J1013	–	Measurement of Whole Body Vibration of the Seated Operator of Off-Highway Work Machines
SAE J1127	–	Low Voltage Battery Cable
SAE J1128	–	Low Voltage Primary Cable
SAE J1292	–	Automobile, Truck, Truck-Tractor, Trailer, and Motor Coach Wiring, Recommended Practice
SAE J1349	–	Engine Power Test Code – Spark Ignition and Compression Ignition – Net Power Rating
SAE J1383	–	Performance Requirements for Replaceable Bulb Motor Vehicle Headlamps
SAE J1436	–	Requirements for Engine Cooling System Filling, Deaeration, and Drawdown Tests
SAE J1587	–	Electronic Data Interchange Between Microcomputer Systems in Heavy-Duty Vehicle Applications

SAE J1708	–	Serial Data Communications between Microcomputer Systems in Heavy-Duty Vehicle Applications, Recommended Practice
SAE J1839	–	Coarse Droplet Water/Fuel Separation Test Procedure
SAE J1939	–	Recommended Practice for a Serial Control and Communications Vehicle Network
SAE J2014	–	Pneumatic Tires for Military Tactical Wheeled Vehicles
SAE J2360	–	Oil, Lubricating, Gear, Multipurpose (Metric), Military Use
SAE J2580	–	Identification and Installation of Air Brake System Components
SAE J2627	–	Commercial Vehicle Braking System Definitions

(Application for copies should be addressed to the Society of Automotive Engineers, 400 Commonwealth Drive, Warrendale, PA 15096, or www.sae.org/).

TIRE AND RIM ASSOCIATION (TRA)

Tire and Rim Association Yearbook

(Application for copies should be addressed to the Tire and Rim Association, Inc., 3200 West Market Street, Akron, OH 44313, or http://www.us-tra.org/).

2.4 Order of precedence. In the event of a conflict between the text of this document and the references cited herein, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

3. REQUIREMENTS

3.1 First Article. When specified, a sample shall be subjected to first article test and inspection in accordance with 4.2.1

3.2 Physical Characteristics. The MMPV shall be an all wheel drive (see 3.11.1), blast protected (see 3.18 and 3.19), crew transport (see 3.12), and cargo hauling (see 3.12.5) vehicle with the capability to accept either a remote weapons station or a crew served weapons mount (see 3.12.11).

3.2.1 Materials. Materials shall be of sufficient durability to meet all performance requirements, in any of the environments specified herein. The materials in the vehicle hull and armoring (transparent and opaque) of the MMPV shall be the same from vehicle to vehicle.

3.2.2 Rubber materials. Rubber products furnished, like tires and hoses, shall be manufactured from material less than four calendar quarters old, from the date of cure to date of manufacture. Rubber hose material shall be compatible with the type of fluids for which they are to be used.

3.2.3 Recycled, recovered, or environmentally preferable materials. New parts made from recycled, recovered, or environmentally preferable materials should be used to the maximum extent possible, provided that the material meets or exceeds the operational and maintenance requirements.

3.2.4 Corrosion prevention and control. The vehicle shall be fabricated from compatible materials, inherently corrosion resistant, or treated to provide protection against the various forms of corrosion and deterioration to which they are susceptible. Dissimilar metals shall not be used in immediate contact with each other unless protected against galvanic corrosion.

3.2.5 Hazardous Materials. Asbestos, radioactive materials, hexavalent chromium (electroplating and coatings), cadmium (electroplating), or other highly toxic or carcinogenic materials (as defined in 29 CFR 1910.1200) shall not be used in the manufacture or assembly of the MMPV without prior approval

from the government. The MMPV components and accessories shall not be made from, leach, or otherwise develop toxins, hazardous materials, or Class I or Class II ozone depleting chemicals. Materials shall not have an adverse effect on the health of personnel, when used for their intended purposes. Contractor shall provide all environmental certifications prior to the Start of Work meeting. These requirements shall apply to any components/parts purchased through a subcontractor/vendor.

3.2.6 Finish. Shall be treated and painted in accordance with MIL-DTL-53072. Unless otherwise directed in the production order (see 6.2), the color shall be desert tan, color no. 33446 of FED-STD-595. There shall be no exposed chrome, reflective surfaces, or ornamental trim. Surfaces either not normally painted or not suitable for painting shall be treated and finished to provide a surface of minimal reflectivity, as shall interior components visible from the exterior. Other internal components may be finished with the manufacturer's standard colors and matte finish paint, plating, or treatment. Non-skid material shall be applied to flat surfaces where operators and maintainers are likely to walk or stand.

3.2.6.1 Camouflage. When specified in the production order (see 6.2), the vehicle shall be finished in a camouflage pattern (see 6.4), to be provided at time of production order.

3.3 Configuration. Power train components shall be compatible with and properly matched to all driven mechanisms simultaneously. The vehicle structure shall be capable of withstanding the strain, vibration, and other detrimental effects inherent to off road travel as described in Mobility (see 3.13.2) and the performance requirements of 3.13.2.3 – 10.

3.4 Components and Ratings. The MMPV shall be provided with all new parts (3.2.3) and components. All individual components, including but not limited to the engine, transmission, driveline, axles, suspension, and tires shall be common for all vehicles and shall be rated at or above the vehicle's gross vehicle weight rating. All vehicle ratings shall be the manufacturer's published ratings; individual component ratings shall not be arbitrarily raised to meet requirements. While this specification cites inch-pound units, products made to the metric equivalents are acceptable (6.6).

3.4.1 Engine. The MMPV shall be supplied with an electronically controlled, liquid-cooled diesel engine capable of the performance specified herein while operating primarily with aviation, kerosene type turbine fuel, grade JP-8 in accordance with MIL-DTL-83133 or MIL-DTL-5624, (JP-5). Contractor shall ensure National Security Exemption labeling requirements are met IAW EPA regulations. The engine shall also be capable of performing as specified herein while operating on diesel with sulfur content of up 3,000 ppm and military lubricants (see 3.4.3). The MMPV engine is neither subject to EPA Motor Vehicle Heavy Duty Diesel Exhaust emission standards, nor the EPA Non-road exhaust emission standards since the vehicle will contain permanent armor protection. This determination is IAW 40 CFR, Sections 85.1703, 89.908 and 1068.225. Pollution control technologies that are affected by the sulfur level of the JP-8 fuel either in maintenance or life expectancy shall not be used, e.g., Exhaust Gas Recirculation (EGR), NOX traps, catalytic converters, etc.

3.4.1.1 Engine air intake. The MMPV shall be provided with not less than one air cleaner that meets or exceeds the requirements of MIL-PRF-62048, and shall provide a minimum dust capacity sufficient for a 60 hour service life without removing and cleaning. The induction air ducts shall not require disassembly for normal vehicle maintenance or element servicing. An air cleaner restriction indicator, visible from the driver's seat, shall be provided. The restriction indicator shall retain and display the highest restriction level attained during vehicle operation. The indicator shall allow reset from inside the vehicle and shall retain the reading after the engine is shut off.

3.4.1.2 Dusty Conditions. If the OEM standard engine air intake is not able to meet the requirements of MIL-PRF-62048 with Arizona Test Dust (A1) per ISO 12103-1 A1, then at the government's direction the contractor shall provide a kit that will enable the vehicle to do so.

3.4.2 Cooling system. The cooling system shall be able to handle hot, dusty (very fine particulates, ISO 12103-1 A1) desert environments and be properly designed for sustaining temperatures resulting from towing operations as specified herein when operating in a steady state condition. The cooling system shall be capable of retention and recovery of 6% coolant overflow or have 6% expansion reserve capacity. The cooling system shall meet the requirements of SAE J1436 except that the system shall be able to have a minimum of 10% of its volume drawn down before aeration is seen in the engine outlet sight glass. Initial fill of the cooling system shall be a mixture of 50 percent water and 50 percent antifreeze conforming to A-A-52624. The cooling system shall meet the following requirements:

a. Maintain the specified component operating temperatures within the specified limits while operating continuously at full load and 0.6 tractive effort to gross vehicle weight ratio (TE/GVW) while under the maximum temperature conditions specified herein.

b. Does not exceed temperature limits while operating at rated engine power.

c. Meets the requirements after a drawdown of 10% of engine coolant.

Specified fluid temperatures shall not exceed those for which the component manufacturer shall provide warranty. If the system is also used to cool the transmission, it shall do so without degradation of cooling to the engine, as described. If the cooling system fan is provided with a thermostatic control, in the event of its failure, the fan shall continue to operate while the engine does. Hoses shall conform to A-A-52426.

3.4.3 Lubricating Oil(s). All parts and components shall be compatible with specified military lubricants referenced in MIL-PRF-2104. Initial lubrication and all subsequent lubrication shall be compatible with military lubricant referenced in MIL-PRF-2104. Gear lubricating oil shall conform to SAE J2360. A lubrication data plate in accordance with SAE J753 shall be mounted on the MMPV and shall identify all lubricants and fluids (and Military equivalents) and the appropriate temperature ranges to be utilized when servicing the vehicle. The engine oil filter location shall be labeled, specifying filter type, and placed near the point of filter installation.

3.4.4 Fuel tanks. The MMPV shall be provided with corrosion resistant, integral fuel tank(s) of sufficient capacity to satisfy the vehicle range requirements as specified in 3.13.2.2. Each fuel tank shall be supplied with a drain plug, at its lowest point, removable with common hand tools and without requiring removal of any other vehicle component. Manual shut-off valve(s) shall be furnished at the tank(s), on the fuel supply line before the fuel filter(s); labeled "FUEL SHUT-OFF", with double ended arrows indicating the direction of operation and the functional result (i.e., open, closed). Readily discernable at or on the fuel fill port, or its cap, "JP8/Diesel Fuel" shall be indelibly marked in letters not less than 1-inch high. Fuel tank ports must be a minimum of 2.25 inches inside diameter, and shall be compatible with Army and NATO dispensing nozzles having a nominal outside diameter of 2 inches. The fuel tanks shall be capable of accepting fuel at a rate of not less than 50 gallons per minute. The fuel fill port(s) shall be provided with removable strainers, and shall accept fuel from a 5-gallon can conforming to A-A-59592, by a person on the ground. Fill port(s) shall be supplied with captivated safety filler cap(s) made to preclude mud build-up and intrusion into the tank. A sealed cap and vent shall be furnished if the port is below fording depth (see 3.13.2.7). A fire protection method shall be provided to allow safe egress of the crew and minimize fire damage to the vehicle when the fuel tanks are penetrated by a landmine, an IED or other overmatching ballistic threat.

3.4.4.1 Fuel system. The fuel system shall meet the requirements of FMCSR 393. The MMPV fuel system shall be provided with a fuel and water separator. The separator shall include a water coalescer and a drain valve and shall meet the requirements of SAE J1839. A combination fuel filter/water separator may be furnished. The fuel system design shall be such that fuel spilled during refueling will not contact any part of the exhaust or electrical system. The fuel system shall be protected

to the same levels as specified in 3.18 and 3.19. Fuel, air, and hydraulic lines shall be readily distinguishable and not have common or interchangeable couplings.

3.4.5 Exhaust system. The exhaust system shall meet the requirements of FMCSR 393.83. The exhaust system shall be leak-proof and the point of exhaust shall be located so as not create a toxic or nausea hazard to the operator and crew or personnel performing maintenance tasks with the engine operating. The point of the exhaust shall also be located and directed so as to prevent the drawing of exhaust into the NBC unit. The system shall provide protection against burn hazards to personnel. The exhaust pipe(s) shall be configured or equipped to prevent entry of precipitation; and for naturally aspirated engines, furnished with a spark-arresting muffler, located away from the fuel system and any other flammable components. All components of the exhaust system shall be fabricated from inherently corrosion resistant materials such as stainless steel; aluminized steel shall not be used.

3.4.6 Transmission. The MMPV shall be equipped with an automatic transmission (as defined by SAE J645) and meet the requirements of 102.1 of MIL-STD-1180. The automatic transmission shall be electronically controlled, shall have a downshift inhibitor, and shall preclude inadvertent reversal of vehicle direction. Shifting controls shall be of the dash mounted, push-button type. The transmission (or transfer case) shall have a power take off opening in accordance with SAE J704. Optimization of automotive performance through electronic interfacing of at least the transmission and engine is an objective.

3.5 Electrical system. The MMPV shall be equipped with a 12 and/or 24 volt, waterproof (per fording requirements, 3.13.2.7) electrical system. Electrical system shall be in accordance with FMCSR 393.27 through 393.33. An auxiliary power unit, defined as a compact starter-generator (or electric induction motor) mounted between the engine and transmission in the transmission bell housing, or in a similar mounting location, can be used.

3.5.1 Circuits. The 24 volt D.C. electric power circuits shall conform to the MIL-STD-1275. Reverse polarity protection shall be incorporated in the system. Each circuit shall be protected by a circuit breaker or fuses, with labels (or other coding) indicating the function served by the circuit. The enclosure for the circuit breakers or fuse box(es) shall be inside the crew compartment of the vehicle. All circuit breakers shall be a manual-resetting type and shall be readily accessible. Spare fuses, if fuses are used, in each amperage rating used on the vehicle, shall be present and located on the fuse panel. The ability (space claim) and design flexibility to expand or enhance the electrical system (i.e., add additional fuse boxes, add circuits, etc.) is an objective.

3.5.1.1 Master Electrical Power Switch. A master electrical power switch accessible from the driver's seat shall be provided to allow the operator to shut off battery power to the vehicle. The master electrical cutoff shall also turn off the engine before disconnecting electrical power.

3.5.1.2 Battery Disconnect. Switches shall be provided, one in the crew compartment, one in the vicinity of the batteries, capable of safely disconnecting the batteries from the vehicle's electrical system. The outside switch shall not be readily accessible from the ground and external to the vehicle.

3.5.1.3 Starter. Starter protection shall prevent starter re-engagement with the engine running and must be capable of re-engaging within two seconds (maximum) after the engine is stopped. The starter shall be sealed and/or its mounting housing vented to prevent starter corrosion.

3.5.1.4 Robot Charging. The MMPV shall be equipped with the electrical components to recharge the batteries for the robot. The vehicle shall be capable of charging the robot batteries while the engine is idling. The electrical requirements are:

a. Operator control unit batteries - 100 to 250 Vac, 50/60 Hz, 2 amps at 110V.

b. Robot vehicle batteries - 85 to 264 Vac, 50/60 Hz, 6 amps at 110V.

3.5.2 Electrical System Capacity. The MMPV shall provide sufficient current to operate all electrical components (lighting; all command, control, communication, computer, information, surveillance and reconnaissance (C4ISR) equipment; electronic countermeasures (ECM) equipment; and charge the batteries), when engine is operating at idle speed; approximately 400 Amps.

3.5.2.1 Alternator/Regulator. If used, the provided alternator shall be a minimum 400 Amp, 12 or 24 volt DC radio suppressed alternator. The alternator shall be configured to prevent internal alternator corrosion during its expected normal service life. The ability (space claim) and design flexibility to switch to a larger alternator or add an additional alternator is an objective. The MMPV shall be equipped with a dual voltage charging system. The voltage control system must be capable of maintaining battery equalization and battery balance when batteries are unmatched or in the same state of charge and provide for separate voltage regulation for the batteries of each voltage system.

3.5.3 Slaving components. The MMPV shall be equipped with a 24-volt slave receptacle that shall mate with connectors conforming to STANAG 4074, Type I. The receptacle shall permit charging of the batteries and slave starting of the engine from an external power source; and provide a power source for charging and slaving other equipment. The slave receptacle shall be installed on the exterior of the vehicle, accessible to personnel standing on the ground. The slave receptacle shall be labeled "SLAVE, 24 V" in letters 1.0 inch high.

3.5.4 Trailer Connector. The MMPV shall be equipped with connectors in accordance with STANAG 4007 necessary to operate electrical components of towed military trailers and with all necessary connectors at the front of the vehicle to operate the electrical components of the vehicle when being towed by a like vehicle.

3.5.5 Ignition Switch. The MMPV shall be equipped with a keyless ignition that prevents damage to communication/radio and any other electrical/electronic accessories that draw power through the vehicle's power distribution system due to voltage/current spikes while the vehicle starter is engaged. Those components, subsystems, and/or systems that draw power directly from the vehicle's batteries will not be protected by the ignition switch. Sufficient power from the vehicle's batteries shall be transmitted to the starter while the ignition switch is activated to ensure vehicle start under all climatic conditions.

3.5.6 Electrical Outlets. The MMPV shall be furnished with not less than four each 110 VAC and four each 12 VDC outlets inside the vehicle. One of each shall also be provided on the outside of the vehicle. All external outlets shall be protected from adverse effects of the elements and the 110 VAC outlets shall be provided with ground fault circuit interrupter devices.

3.5.6.1 External Shore Power. The MMPV shall be provided with an external electrical receptacle for 120/208, 3 phase VAC power in, with connector conforming to MS90558C44413P as described in MIL-DTL-22992 and compatible with MIL-STD-1332B for receiving external power, charging the batteries, and grounding the vehicle. The MMPV shall have the ability (with adapters/converters, if necessary) to connect to US and foreign power grids. The cover or lid shall be weatherproof and lockable by padlock.

3.6 Lighting. In addition to individual controls, The MMPV shall be equipped with a master switch conforming to MIL-PRF-11021 to control all lights. The MMPV shall be equipped with turn signals (self-canceling), backup lights, and emergency flashers. Emergency flashers, when activated, shall be overridden by the brake lights when the brakes are applied. License plate lamps are not permitted. Where possible, LED lighting which has lower electrical power requirements, increased durability, and longer lifetimes than fluorescent, halogen, or incandescent lighting is an objective.

3.6.1 Headlights. Headlights shall be mounted in a protected location and shall meet the requirements of 108 of MIL-STD-1180. The headlights shall be white as defined in SAE J578 and shall be rated at not less than 6400 candela per square centimeter as measured according to SAE J1383.

3.6.2 Blackout lights. Blackout lights conforming to STANAG 4381 shall be provided as follows:

a. One left front headlight. The blackout headlight shall be mounted on the left front of the plan outline of the vehicle. The blackout front marker lights shall be mounted on the front of the vehicle, as far apart as practical, one each side of the vertical centerline at the same level.

b. Two front marker lights.

c. Two rear stop/marker/taillights. The blackout taillights shall be mounted in a protected location, recessed not less than ½-inch into hole or behind the guard.

Blackout lights shall be operated by an interior switch conforming to MIL-PRF-11021. All interior and external lights except crew lighting (see 3.6.3), the horn, and the backup alarm shall be made inoperable when blackout lights are used except for warning lights. The warning lights, such as temperature and oil lights, shall remain operative in the blackout mode, but shall automatically switch to blackout or low visibility mode to be compatible with nightvision equipment.

3.6.3 Crew lighting. Overhead lights shall be provided in the crew area with cab area controls and individual on/off switches for each light. The dome lights shall be equipped with both white and military blackout lights. The lights shall be able to be switched manually from white to military blackout and shall switch automatically to military blackout when any door to the vehicle is opened.

3.6.4 Spotlight. A minimum of one, remotely adjustable/aimed, spotlight shall be provided in accordance with the classified addenda to this purchase description.

3.6.5 Area Lighting. Exterior scene lighting shall be provided in accordance with the classified addenda to this purchase description.

3.6.6 Instruments. The vehicle shall be equipped with gauges/indicators which shall be readily visible to the full range of user personnel, adequately lighted for normal operation and with infrared radiation emission levels, when lighted for blackout condition operation, in accordance with MIL-STD-1179, except that infrared radiation emission levels for those indicator lights which must be red in color shall not exceed 10% of the peak emission level. Intensity of instrument and gauge lighting shall be adjustable. Interior lights, gauges and instruments, to include warning lights, shall not emit energy outside of the 380-700 nanometer wavelength range while in blackout mode. Color coding of illuminated instruments shall conform to paragraph 5.2.2.1.13 of MIL-STD-1472.

3.7 Wiring. Weatherproof wire and connector assemblies shall be in accordance with SAE J1128/J163. Wiring, including numbering, shall be in accordance with SAE J1292; and routed in a protected location. The wiring shall be compatible with the electrical system capacity 3.5.2.

3.8 Battery. Battery(s) shall conform to SAE J537 and be sufficient to start the vehicle in all environmental conditions specified herein. Maintenance free batteries are required. Battery cables conforming to SAE J1127 shall be furnished with insulated terminal covers. Positive and negative cable terminals shall be identified with a red sleeve, labeled "+" and a black sleeve, labeled "-", respectively.

3.8.1 Battery mounting. The battery shall be mounted above fording depth (see 3.13.2.7) and be accessible for removal and service without requiring removal of components other than a cover, if one is

provided. Battery mounting shall not interfere with access to components; shall support the entire battery base; and be positioned so that the indicator is observable without removing the battery. Battery restraints shall be provided to hold the battery in a fixed position. The battery mount shall have provisions for drainage and venting, and shall be protected against corrosion and short-circuiting.

3.9 Platform Diagnostic Capabilities. The MMPV shall have at-platform diagnostics IAW 3.9.1 or embedded diagnostics IAW 3.9.2 when Line Replacement Unit (LRU) fault isolation capability is equivalent or greater than sections 3.9.1. In addition when applicable, the MMPV shall have the diagnostic ability to identify major system LRU failures (e.g. check engine lights, blinking/flashing lights etc.).

3.9.1 Electronic. The MMPV must be compatible with current U.S. Army Standard Unit Level Test Equipment which is presently the MSD (Maintenance Support Device). Diagnostic connectors and circuits must be compatible with current standard Army test equipment. Diagnostic connectors shall be easily accessible, hard mounted and environmentally protected. The diagnostic connectors shall be equipped with a cover, which shall prevent entrance of moisture and contaminants. The MMPV shall feature either a single data bus network as specified by SAE J1939, J1708, or a multiple data bus network in accordance with J1939, which defines the interface between J1708 and J1939. The MMPV data bus shall have built in sensors that provide fault isolation capability sufficient to identify failures of major components of each system monitored by the data bus. Diagnostic outputs shall be transmitted to the vehicle mounted J1939 female 9 pin Deutsch Connector, which shall conform to SAE J1939-13 'Off-board Diagnostic Connector' dated July 1999. Software required to interface, retrieve, and interpret vehicle system's diagnostic data shall be provided to the government. Software shall be capable of displaying operator/ driver informational data associated with each error code.

3.9.2 Embedded diagnostics. The MMPV shall feature either a single data bus network as specified by SAE J1939, J1708, or a multiple data bus network in accordance with J1939, which defines the interface between J1708 and J1939. The MMPV data bus shall have built in sensors that provide fault isolation capability sufficient to identify failures of major components of each system monitored by the data bus. Software required to interface, retrieve, and interpret vehicle system's diagnostic data shall be provided to the government. Software shall also be capable of displaying operator / driver informational data associated with each error code. Software shall be capable of performing a self-test. An on-board display screen capable of retrieving and interpreting diagnostic error codes of major components of each system monitored by the data bus is an objective.

3.10 Winch. The MMPV shall be provided with a front-deployed vehicle mounted winch in accordance with SAE J706, rated at not less than 15,000 pounds bare drum first-layer, single-line pull and equipped with overload protection for moving heavy objects. The winch shall be equipped with a minimum of 75 feet of cable with clevis ends and a roller fairlead. The winch shall be provided with a remote control, which will allow the winch to be operated from a minimum distance of 12 feet from the vehicle. The winch shall not interfere in any way with towing operations.

3.11 Vehicle hull or Chassis. The vehicle hull or chassis and related subsystems shall be of sufficient durability and strength to withstand the stresses imposed in any of the operations intended to be performed by the vehicle; and by its deployment.

3.11.1 Axles. All axles shall be powered. An inter-axle differential shall be provided, equipped with a lock-up device with automatic disengagement. The wheel offset shall be the same on all axles to allow interchangeability of wheel assemblies. All axles shall be properly vented and equipped with lubricated wheel bearings and seals adequate to meet fording requirement (see 3.13.2.7). If tandem rear axles are provided, as much as feasible, the rear axles, differentials, and other components shall be interchangeable, between the two tandem axles. Axle ratings in excess of the current GVW of the vehicle and/or the ability to switch to larger load carrying capacity axles are an objective.

3.11.2 Torque limiting differentials. Traction control or positive direct drive to each wheel, with minimum effect to vehicle steering, shall be provided. If a full locking traction control device is utilized, it shall be capable of being implemented without stopping the vehicle. If traction control is operator controlled, a warning light shall be installed and labeled in a position clearly visible to the operator that shall be illuminated when engaged.

3.11.3 Suspension. Damping shall be provided at all wheels to meet performance requirements.

3.11.4 Tires and Wheels. The vehicle shall be equipped with single tire and wheel assemblies on each axle. The wheels shall be of a single-piece or bolt-together type construction, and conform to Tire and Rim Association recommendations for the type and size of wheels furnished. All tire and wheel assemblies shall be balanced; and be identical. The tires shall be equipped with on-off road non-directional tread. Tires and wheels shall meet the requirements of 119 and 120 of MIL-STD-1180 and SAE J2014. The tires shall be tubeless, radial ply tires, with ratings conforming to Tire and Rim Association recommendations for the maximum weight and maximum speed of the vehicle. The tire/wheel shall maintain sufficient clearance to accept military style tire chains for artic operations. Ballast or hydro-inflation of tires is not permissible. Run-flat inserts are required which shall allow the MMPV to travel not less than 30 miles at not less than 30 mph after the tire is flat. A spare tire and wheel assembly identical to those provided on the axles shall be furnished, and provided with the vehicle. A mechanical assist device shall be provided which shall permit dismounting and re-stowing of the spare assembly by no more than two crew members, one crew member (objective), within 30 minutes.

3.11.5 Wheel Splash and Stone Throw Protection. Fenders or equivalent protection shall be provided for all wheels; a continuous fender (front to rear) on each side of the vehicle is acceptable. Adequate clearance for vehicle maintenance and the attachment of snow chains (A-A-52507) shall be provided. Protection to the rear against rear wheel splash and stone throw shall include anti-sail mud flaps that will not be lifted up by high speed air flow and be in accordance with SAE J682. If pinned under wheels or other objects, mudflaps shall tear away without causing any damage to supporting structures. Vehicle design shall to the maximum practical extent prevent wheel splash and stone throw damage to other parts of the vehicle, i.e., battery compartment; fuel, air and hydraulic tanks and components; vehicle framing; electrical, pneumatic and hydraulic tubing; harnesses and electrical components; drive train and cooling system; exhaust system; wheels and rims; suspension system, as well as towed equipment. The flaps shall be removable using only onboard hand tools.

3.11.6 Service brakes. Vehicle shall be provided with full air brakes equipped with an anti-lock braking system (ABS) that conform to FMVSS 121. Brakes shall be furnished on all wheels. Pedal size(s) shall meet the separation, resistance, and displacement requirements of MIL-STD-1472F.

3.11.6.1 Air system. The following shall be required:

a. Air storage reservoir(s), each tank shall be equipped with drain, safety and check valves in accordance with SAE J10.

b. Air control valves.

c. Air pressure gage, visible to the driver.

d. Low air pressure warning, visible and audible.

e. Air compressor, engine driven and engine lubricated, air or water cooled, capable of not less than 12 cfm at 120 pounds per square inch.

f. Shall be provided with external connections for powering air tools.

g. Service brake stop lamp switch.

h. Automatic moisture ejector/evaporator.

i. Front and rear air brake service line couplings conforming to SAE J318 in the front and rear of the vehicle

3.11.6.2 Trailer brake provisions. In addition to the components specified above, a complete trailer brake control system shall be furnished that includes, but is not limited to, the following:

a. Trailer stoplight operative with foot control and with control for trailer brakes.

b. An interconnection to mate with the electrical system on the towed trailer (3.5.4).

c. An interconnection for air service to the trailer brakes.

d. Emergency and service lines, and connectors identified per SAE J2580.

3.11.6.3 Increased braking ability. An alternative braking system shall be furnished (i.e. "Driveline Retarding," "Engine Retarder," or "Exhaust Brake," per SAE J2627). Dash board activation for this system shall be provided.

3.11.6.4 Parking brake. A parking brake system shall be furnished that shall hold on a 30 percent grade, pointing either up or down hill.

3.12 Crew compartment. The vehicle shall be equipped with a waterproofed (to the extent specified in 4.9.49), insulated, rigid crew compartment. The crew compartment shall be capable of transporting 3 Soldiers in addition to the driver, with all their combat equipment and weapons. Crew compartment design shall conform to requirement 302.1 of MIL-STD-1180. The ability to reconfigure the interior of the crew compartment based on mission needs and/or evolving requirements is an objective.

3.12.1 Seating. To the maximum extent possible, seats shall be designed to minimize shock absorption from mine and IED blast impacts at the levels specified in the force protection paragraphs (see 3.18 – 19). All vehicles shall be equipped with one seat per occupant with all seating systems, seatbelts, and seatbelt assemblies and anchorages that meets FMVSS 207, 209, 210, and 302. Seats shall be equipped with restraint systems/harnesses with a single point quick release feature, capable of restraining a 5th percentile female through 95th percentile male military personnel in full battle gear. If forward and aft-facing seats are provided, the seats shall provide head supports, to control head movement. The ability to reconfigure seating (including, but not limited to: seating locations and the ability to adjust to improve the visibility out the side windows of the vehicle) is an objective. Seatbelts shall be accessible to the occupants at all times, unless purposely stored. Seatbelts shall be fully retractable with provisions for off floor storage and shall not automatically lock out when the vehicle is on extreme slopes so as to not preclude the operator/passengers from dismounting and re-entering the vehicle. The aisle between the seats shall not be less than 20 inches (29 inches, objective), per guidance from MIL-HDBK-759.

3.12.1.1 Driver's seat. The driver's seat shall be adjustable: fore and aft and up and down, tilt/recline, backrest, and located to provide maximum unobstructed visibility for the operator.

3.12.2 Glass. The windshield and automotive glass provided with the MMPV shall meet or exceed the force protection and system survivability requirements (see 3.18 and 3.19) and shall be water

white/un-tinted. Glass exceeding all requirements of the "Purchase Specification, Transparent Armor; ATPD 2352", for the offered threat level is an objective. If Night Vision Goggles (NVG) compatible glass is not utilized the vehicle shall be capable of hosting the Driver's Vision Enhancer (DVE). Technology, such as "peel plies," to protect the front windshield from stone pecking damage is an objective. Gun ports in the windows are not required, but the ability to add later, or to switch to windows with gun ports, is an objective.

3.12.3 Ventilation System. The MMPV shall be equipped with a heating and ventilation system allowing fresh and recycled air to be circulated in the crew compartment. The air shall be dust and dirt filtered. Filters shall be readily accessible for ease of changing. The heating, and ventilation and system shall, at a minimum, meet the requirements of 5.12.6.1−4 of MIL-STD-1472F; the defrosting/de-misting (5.12.6.3) is required for the inside of the windshield only. The MMPV shall be capable of reaching and maintaining an internal temperature of between 65°F and 75°F within 60 minutes after the heater or air conditioner is turned on when outside temperatures are between -25°F and 135°F. Performance in outside temperatures up to 150°F is an objective.

3.12.4 Ingress/Egress Points. The MMPV shall be equipped with a minimum of 3 ingress/egress points (doors/ramps/hatches). Additional ingress/access points are an objective. Means to assist with opening doors and hatches (e.g., hydraulic cylinder) is an objective. Provisions shall be made for emergency extraction of occupants. The ingress/egress points shall be located on the vehicle such that emergency egress from the vehicle is possible by a Soldier in full-combat gear regardless of the orientation of the vehicle. All ingress/egress points shall be capable of being secured from the inside while operating and locked from the outside for storage. Doors and hatches should be equipped with hasps or other devices that allow for pad-locking for storage security. The rear face of the vehicle shall be provided with means to visually check the terrain and threat environment directly behind the vehicle. One of the ingress/egress points will allow individuals to safely egress the vehicle while dressed in a MED-ENG Bomb Suit (LIN A46628). Roof hatches must have locking mechanisms that will keep them either opened or closed while operating in rough terrain.

3.12.4.1 Robot Ingress/Egress. The MMPV shall have the ability via removable ramps to load and unload the robot, weighing up to 1000 pounds at a time, from the ground, into and from the vehicle through the rear door(s) with minimal Soldier exposure and time expenditure (threshold). It is an objective that the MMPV include with the means to access, configure, and rapidly deploy robots from within the vehicle, and for the robot to be able to move out of stowage position and into operation with only the use of the remote controls (objective). The robot dimensions are 36 inches x 25 inches x 36 inches (L x W x H) when deploying.

3.12.5 Storage. The MMPV shall be equipped with space to stow, secure, and carry mission equipment as specified in the classified addenda to this purchase description.

3.12.6 Non-skid surfaces. The MMPV shall have non-skid material applied to the floor of the crew compartment as well as exterior surfaces that facilitate vehicle repairs and/or maintenance.

3.12.7 Gauges and instruments. Gauges and instruments/controls shall be arranged in compliance with SAE J680, identified according to function and meet requirement 101.1 of MIL-STD-1180. Color coding of illuminated instruments shall conform to paragraph 5.2.2.1.13 of MIL-STD-1472. The vehicle shall be equipped with the following instruments and gauges, at a minimum, readily visible to the full range of military personnel, seated in the driver's seat:

a. Voltmeter or ammeter.
b. Fuel gauge.
c. Engine oil pressure gauge.
d. An engine oil low-pressure red indicator light or audible alarm.

e. Engine coolant temperature.
f. An engine high-temperature red indicator light or audible alarm
g. A transmission high-temperature red indicator light or audible alarm.
h. Air pressure gauge with an audible alarm to indicate low air pressure.
i. Speedometer with odometer.
j. Engine tachometer.
k. Transmission fluid temperature
l. Air filter indicator.
m. Inclinometer; gage to show lateral tilt angle
n. Turn signals and emergency flashers

All provided gauges and instruments must meet the requirements in paragraph 3.6.6. Means shall be provided to check the operation of all (visible and audible) alarms. The oil low-pressure indicator or audible alarm may be common to that for the engine high temperature. Gauges shall be in English units or metric and English.

3.12.8 Vehicle accessories. The MMPV shall be equipped with the following, at a minimum:

a. Multi-speed, windshield wiping and washing system conforming to SAE J198 and requirement 104.1 of MIL-STD-1180 (threshold). Manual or powered wiping systems for side windows are an objective.

b. Adjustable visors for both driver and passenger.

c. Two exterior rearview mirrors. The mirrors shall meet requirement 111.1 of MIL-STD-1180, with shock dampening mounts and shall collapse against the cab upon impact.

3.12.9 Mounting of Communications and Electronic Countermeasures. The MMPV shall have storage area with sufficient allocated volume, electrical connections with adequate power, and antenna conduit/wiring provisions appropriate for the mounting of military communications and electronic countermeasures equipment (e.g., Digitalization Rack for the FMTV, 12422685). To the maximum extent possible, the storage area shall be adjustable and the power available to the equipment shall be scalable to accommodate future Army requirements. The storage area shall be grounded in accordance with MIL-HDBK-419A. The storage area shall hold the following equipment, at a minimum:

Communication device	Amperage draws (24 V)
a. Two (2) SINCGARS	20 amp each
b. FBCB2 / BFT	10 amp
c. CREWII (ECM) or DUKE	50 amp
d. VIC-03	1 amp each (for driver and three crew members)

The vehicle electrical output shall be sufficient to simultaneously power all the communications equipment as well as the vehicle's automotive and auxiliary equipment power needs (interior and exterior lighting, robot charging, windshield wipers, etc.). Provisions shall also be made for external mounting of each required antenna and the routing of wiring to the communications mounting location. Also, the MMPV shall be provided with conduit/wiring provisions to the top of the vehicle to host two (2) robotic systems antenna and one (1) light flail system antenna.

3.12.9.1 Fold-down computer terminal. The crew compartment location for the communications equipment shall provide space for a fold-down computer terminal workstation to place a remote control unit for the operator to control the robotic platforms and research ordnance. This space shall be capable

of hosting an operator control unit (OCU) with the following minimum dimensions: 15 inch (L) x 19 inch (W) x 18.5 inch (H) and weighing up to 45 lbs.

3.12.10 Rifle mounting provisions. The MMPV shall be equipped with rifle-mounting brackets capable of securing M16A1, M16A2, or M4 carbines, within reach of the occupants, except the driver. The bracket design documented on drawing number 13229E8014 or 13229E8016 may be used as reference. Whether this or an original design is used, its placement (with rifles in place) shall not hinder any operation of the vehicle.

3.12.11 Weapon station. The MMPV shall be provided with the capability to accept either a remote weapons station or a crew served weapons mount:

a. The remote weapons station (RWS) requirements include the exterior weapons mount, and an interior display and joystick controller mounted in the crew compartment.

b. An M1114 weapon mount or equivalent, and shall be provided with a self-draining, weather tight, quick access hatch. The hatch shall not interfere with the driver's operation of the vehicle and shall securely lock in place when opened or closed. The weapon shall be operable by a crew member while the vehicle is in motion and shall be accessible by any personnel within the vehicle without having to exit the vehicle. The weapon mount shall be provided with a height adjustable gunner platform and shall be provided with a gunner protection kit, which shall be removable (height reducible) for transportation.

The weapon station shall be designed to inhibit shooting of the vehicle. The capability to switch between the two weapons stations is an objective.

3.12.12 Ancillaries. The vehicle shall provide the following items on all production vehicles:

a. Basic Issue Items (BII) - shall include at a minimum the items in attachment: MMPV_BII.xls.

b. Any hand tools not included in the BII that are required to perform operator/crew level maintenance procedures and the attachment/removal of height reducible components.

3.12.13 Towing and recovery provisions. A swivel type, towing pintle in accordance with A-A-52550, Type II shall be provided at the rear of the vehicle. It shall be mounted, with provisions for the attachment of trailer safety chains. The vehicle shall be provided with the means necessary to facilitate recovery (lift and flat tow) by standard Army tow trucks including the unit’s organic M88A2 (R50885) and Truck Wrecker (T63093). Towing provisions shall be in accordance with STANAG 4478.

3.13 Automotive performance characteristics. The vehicle shall be capable of meeting the performance criteria specified in the subordinate paragraphs, at a minimum. All performance requirements shall be met using JP-8 fuel. The vehicle shall operate on standard military fuels and lubricants with no adverse effect on vehicle components or serviceability. Scheduled maintenance intervals shall be as specified in the classified addenda to this purchase description. Performance requirements shall be met with front wheel drive disengaged, except that vehicles equipped with inter-axle compensating devices shall meet performance requirements with front wheel drive engaged. Requirements apply after exposure to and under any environmental conditions specified herein (see 3.16).

3.13.1 Operability. The vehicle shall be able to operate under all conditions specified herein, to within 10 percent of its fuel reserve.

3.13.2 Mobility. The vehicle, with full payload, shall be capable of:

Terrain Type	Percent
Primary Road	45%
Secondary Road	39%
Cross Country (trail)	16%

3.13.2.1 Payload: Shall be as specified in the classified addenda to this purchase description.

3.13.2.2 Range: The MMPV shall be capable of operating on integrated fuel tanks for a distance of 500 miles at the average speed specified in the classified addenda to this purchase description.

3.13.2.3 Sustained Convoy Speed: Capable of sustaining convoy speeds as specified in the classified addenda to this purchase description.

3.13.2.4 Acceleration: Rapid acceleration from 0-50 mph is an objective.

3.13.2.5 Gradeability: The MMPV shall be capable of ascending and descending longitudinal slopes of not less than 60%, a slope of 3% at 40 mph, and a 2% slope at 50 mph.

3.13.2.6 Stability: The MMPV shall be capable of traversing side slopes of not less than 30%. The ability to traverse steeper side slopes is an objective.

3.13.2.7 Fording: The MMPV shall be capable of fording salt or fresh water to a depth of 30 inches without kit or preparation.

3.13.2.8 Braking: The MMPV shall meet the performance requirements of FMVSS 121. The service brakes shall also stop and hold the vehicle on a 60 percent grade of dry concrete, traveling either uphill or down. In the event of a power assist failure, the brakes shall be operable with a force not to exceed 70 pounds with the vehicle on a level surface.

3.13.2.9 Turning performance: The MMPV shall have a wall to wall turning diameter of no more than 75 feet as measured in SAE J695. A smaller turning diameter is an objective.

3.13.2.10 Towing. On a paved level road under all climatic conditions, the MMPV shall:

a. At GVW, tow a like vehicle for not less than 30 miles at a speed of not less than 30 mph, without preparation other than towbar 12322663 and the towbar adapter NSN 2540-01-408-1538 if needed, without degradation or damage to either vehicle.

b. Be towed at GVW by a like vehicle for not less than 30 miles at a speed of not less than 30 mph, with all wheels on ground, without preparation, and without degradation or damage to either vehicle.

3.14 Interface requirements. The MMPV shall interface with transport vehicles as follows.

3.14.1 Dimensions. The vehicle, minus height reducible components (e.g., weapon station) shall not be greater than 102.0 inches high. Height reduction shall be capable of being accomplished utilizing only onboard tools (see 3.12.12). When configured for transport, the overall dimensions shall facilitate transport by all modes listed in 3.14.2.

3.14.2 Transportability. The vehicle shall be fit for self-deployment on highways worldwide; and capable of being transported by highway (M916 LET and M870 trailer), rail, marine, and air modes C-5 and C-17 (threshold) and in C-130 aircraft (objective) as described in MIL-HDBK-1791. The vehicle shall conform to transportability criteria dimensions as set forth in MIL-STD-1366. The vehicle design

shall enable preparation for all modes of transportation and re-assembly after, to be accomplished in not more than 60 minutes with no more than two Soldiers (threshold) at either end of transport using only onboard tools (no disassembly for C-130 transport, objective). Slinging and tiedown provisions shall counteract detrimental vibration and impact forces encountered in handling and transportation, without malfunction, damage, or permanent deformation. Lift and tiedown provisions shall be labeled as applicable in 1-inch high black letters.

3.14.2.1 Slinging provisions. The vehicle shall be provided with slinging provisions conforming to MIL-STD-209. The provisions shall enable the vehicle to be lifted in its normal operating orientation.

3.14.2.2 Tiedown provisions. The vehicle shall be provided with integral provisions to permit tiedown to the floor or deck of the transport vehicle in accordance with MIL-STD-209.

3.14.2.3 Rail Transportability. The vehicle shall be rail transportable in CONUS and NATO countries without restrictions in accordance with MIL-STD-1366. The vehicle shall be capable of withstanding shock loads resulting from rail impact test without degradation or damage. When loaded on a 50-inch high rail car, the vehicle shall meet the dimensional requirements of the Association of American Railroads (AAR) Outline Diagram for Single Loads, Without End Overhang, on Open-Top Cars and the *Gabarit International de Chargement* (GIC) equipment gauge diagram (Figure 1) which apply to Standard gauge rail lines in the Continental United States (CONUS) and European countries.

3.14.2.4 Marine Transportability. The vehicle shall be transportable on breakbulk (general cargo), roll-on/roll-off (RORO) ships, and barge carrying (LASH and SEABEE) ships without disassembly. The vehicle shall also be transportable on the LARC-LX and larger tactical lighterage.

3.15 Government-furnished property. When specified in the contract, the Government will furnish the following property in the quantities indicated in the contract or order (see 6.5):

Nuclear, Biological, and Chemical protective ensemble (MOPP IV)	
Soldier basic gear, to include PPE, wet, and cold weather gear	
SINCGARS Radio Set, AN/VRC-88A (w/RT1523 C/U) w/Antenna Vehicular AS-3684/VRC	5820-01-267-9481 w/ 5985-01-189-7925
FBCB2 with BFT	
CREW2 / ECM / DUKE	
VIC-03	
Current Army TMDE (SPORT or MSD)	

3.16 Environmental parameters. The MMPV shall operate in the following environments.

3.16.1 Operating temperatures. In accordance with MIL-STD-810, the MMPV shall perform as specified herein in any ambient temperature from -25°F to 135°F, (150°F Objective) without performance degradation, or mechanical or electrical failure.

3.16.2 Storage temperatures. The MMPV shall withstand indefinite storage and transport in the "Storage and Transit Conditions" for "Hot-Dry (A1)" and "Cold (C2)" from AR 70-38.

3.16.3 Rain. The vehicle shall be capable of withstanding rain at a rate not less than 4 in/hr with a wind velocity not less than 40 mph with no water intrusion into the crew compartment.

3.16.4 Fungus. Components and materials used in the construction of the vehicle shall be fungus-inert (see 6.7.7). Parts not constructed of fungus-inert materials shall be treated with moisture and fungus

proof varnish or other commercially available preparation. This requirement need not apply to components within hermetically sealed enclosures.

3.16.5 Sand/Dust. The crew compartment shall be protected and sealed from blowing dust, and sand intrusion. When closed, all ingress/egress points shall prevent dust from entering the interior during transport and while in use.

3.16.6 Electromagnetic Environmental Effects (E3). The MMPV shall be electromagnetically compatible among all subsystems and equipment within the system and with E3 external to the system. To meet this requirement compliance to MIL-STD-464 to the extent delineated in the following paragraphs shall be achieved.

3.16.6.1 Intra-system Electromagnetic Compatibility (EMC). The system shall be electromagnetically compatible within itself such that the system operational performance requirements are met. Individual subsystems and equipment shall meet interference control requirements (such as conducted emissions, radiated emissions, conducted susceptibility and radiated susceptibility requirements of MIL-STD 461) such that the overall system complies with MIL-STD 464.

3.16.6.2 Inter-system EMC. The system shall be electromagnetically compatible with its defined Electromagnetic Environment (EME) such that its operational performance requirements are met. The applicable external EME for ground systems is described in MIL-STD-464 Table 1C. Inter-system EMC covers compatibility with, but is not limited to like platforms (such as other MMPVs), friendly emitters, and hostile emitters.

3.16.6.3 High-altitude EMP (HEMP). The system shall meet its operational performance requirements after being subject to the HEMP environment. Recycling power to restore operations is acceptable. The HEMP environment is defined by MIL-STD-188-125-2.

3.17 Sustainment parameters. Vehicle mounted equipment and any associated hardware and software to monitor vehicle performance and provide data for preventative maintenance tasks is an objective.

3.17.1 Maintainability. Provisions shall be made for inspection, adjustment, servicing, and replacement of components. Contractor Logistics support, if required, shall not be lower than Field Level Maintenance, as defined in AR 750-1. Items requiring periodic or preventive maintenance shall be accessible without requiring removal of other components. When openings are necessary for access to components, they shall conform to the requirements of 3.21.3 and be provided with a removable or hinged cover when in an exterior wall or bulkhead.

3.17.2 Compatibility. The MMPV shall be compatible with the Standard Army Logistics System for existing equipment and be consistent with commercial industry's maintenance support concepts. No more than 5% of the tools and equipment shall be procured from outside the standard Army Supply Catalog inventory for battle damage repairs and regular maintenance. A list of Supply Catalogs is in DA Pamphlet 25-30, Section 6.

3.17.3 Ease of maintenance. The time required to accomplish daily preventive maintenance checks and service (PMCS) on the vehicle shall be not more than 30 minutes and shall require no more than the operator plus one (1) crew member. Provisions for drainage of liquids from components shall not permit drainage onto other components; but directly, or routed, into a suitable container. Drain plugs installed in engine, transmission, transfer case, and axles shall be at the lowest point and feature permanent magnet assembly or an equivalent ease-of-maintenance aid(s). The same or similar ease-of-maintenance aids shall be incorporated into other components requiring disengagement or disassembly, like the transmission oil pan, filter housings, etc. Labor saving components/equipment provided with the

vehicle is an objective. The MMPV design must allow for a single, annual scheduled maintenance service period that meets the parameters of 9,000 miles, 3,000 operating hours or annually, whichever occurs first. Total time for the scheduled maintenance service will not exceed 12 man-hours per vehicle per service (threshold; 6 man-hours per vehicle per service objective)

3.17.4 Reliability and Maintainability (R&M). The Mean Miles Between System Abort - Mobility (MMBSA-M) for the MMPV shall be at least 1500 miles demonstrated or assessed at high confidence. The Maintenance Ratio (MR) will be no greater than 0.23 maintenance hours per operating hour. For purposes of evaluating the MR, an operating hour is considered to be equivalent to an engine operating hour. The MMBSA-M and MR include all system aborts and associated maintenance which occur during government testing, regardless of the cause (i.e., includes system aborts attributed to hardware as well as accident, crew/operator, maintenance personnel, technical documentation, and training).

3.17.5 Reparability. At the Field Level Maintenance levels, the MMPV shall be repairable after battle damage, by featuring "frangible" components (i.e., components easily removed and replaced once damaged). The vehicle shall demonstrate a Mean Time to Repair (MTTR) of not greater than 8 hours (threshold), 2 hours (objective) after a mine blast or explosive hazard blast at threshold level as described in 3.18 a-e. Shorter MTTR's are an objective.

3.18 Force Protection. Force protection is defined as "Protection of personnel (Soldiers) inside the vehicle against the identified threats." Crew members shall not be incapacitated due to acceleration forces, fragments, or projectiles. The MMPV shall be designed to prevent crew compartment penetration from the identified threats below. The ability to enhance force protection at a later date is an objective. Protection shall be provided against each of the following threats in accordance with the classified addenda to this purchase description:

a. Mine blast.

b. Ballistic protection.

c. Fragmentation.

d. Overhead airburst.

e. RPG.

Protection levels above threshold requirements listed in the classified addenda are an objective.

3.18.1 Electromagnetic Radiation Hazards (EMRADHAZ). The system design shall protect personnel, fuels and ordnance from hazardous effects of electromagnetic radiation.

3.18.1.1 Hazards of Electromagnetic Radiation to Personnel (HERP). The system shall comply with current national criteria for the protection of personnel against the effect of electromagnetic radiation. DoD policy is currently found in DoDI 6055.11.

3.18.1.2 Hazards of Electromagnetic Radiation to Fuel (HERF). Radiated EMEs shall not inadvertently ignite fuels. The EME includes onboard emitters and the external EME (see 3.16.6).

3.18.1.3 Initial Nuclear Weapons Effects (INWE). The MMPV shall survive the initial nuclear weapons effects of blast, thermal radiation, initial nuclear radiation and electromagnetic pulse to the same levels where 50% of the operators will remain combat effective long enough to execute the mission IAW criteria levels specified in STANAG 4145 (AEP-4).

3.18.2 Nuclear, biological, and chemical (NBC) contamination. All vehicle components, to include any hydraulic hoses, of the MMPV shall be provided with the capability of to withstand a NBC-contaminated environment and relevant decontamination without losing the ability to accomplish the assigned mission. The MMPV shall be protected against NBC contamination and decontaminant in accordance with STANAG 4145 (AEP-4); shall be decontaminable, and shall be compatible with individual protective equipment. An NBC Collective Protection System (over pressure) shall be provided that meets the requirements of STANAG 4521 (AEP-7).

3.18.3 Mounting Kit, M100 Decontamination System. The vehicle shall be provided with a decontamination apparatus (NSN 4230-01-466-9095) in an accessible location. The decontamination apparatus shall be able to be mounted using a bracket (NSN 5340-01-466-5928) in its upright position. The contract officer will coordinate the location of the system with the contractor.

3.18.4 Mounting of M22 Chemical Agent Automatic Alarm. At the government's direction (for quantity of vehicles) the MMPV shall be provided with an M281 Mounting Kit (NSN 6665-01-438-6959) for the M88 Detector and the M42 Alarm. The kit shall be located on the vehicle and power provided in accordance with TM 3-6665-321-12&P. Holes shall be predrilled and plugged with seals or fasteners.

3.19 System survivability. System survivability shall be provided for each of the following threats in accordance with the classified addenda to this purchase description:

a. Mine blast.

b. Ballistic protection.

c. Fragmentation.

d. Overhead airburst.

e. RPG.

System Survivability levels above threshold requirements are an objective.

3.20 Welding. All ferrous armor and structural steel with a yield strength greater than 80 KSI shall be welded IAW the provisions contained in AWS D1.1. All weld procedures shall be qualified to the provisions contained in AWS D1.1 and documented in the procedure qualification record (PQR) format. As the filler metal will typically not meet base material properties, the acceptance criteria for tensile testing of the qualification weldments shall be coordinated with the designated government representative. The welding of other materials and steel less than 80 KSI yield strength shall be done to any AWS welding standard appropriate for the material, thickness and welding process selected. Documented welding procedures shall be available and qualified to the AWS standard selected for use. All welders shall be qualified to the appropriate welding standard prior to production welding.

3.20.1 Weld joint design. The objective weld joint design is a lap joint for maximum structural integrity and survivability. All weld seams (groove welds) associated with the crew compartment that are not at the edges of the vehicle shall be reinforced to assure that the weld area meets the protection level (3.18 – 3.19) of that surface and shall meet the requirements of NATO AEP-7 for NBC protection.

3.21 Human engineering. Human engineering criteria principles and practices shall be considered as part of the vehicle design. The vehicle shall be capable of being deployed, operated, and maintained by 5th percentile female through 95th percentile male. The vehicle (including the controls and subsystems) shall be operational and maintainable by Military Operational Specialties (MOS) while

wearing full combat gear (to include Load Bearing Equipment (LBE), personal body armor, and protective mask), individual Mission Oriented Protective Posture (MOPP) IV gear, and arctic clothing. MIL-STD-1472 may be used for information and guidance on human factors engineering for Army materiel, and MIL-HDBK-759 may be used as a source for anthropomorphic data.

3.21.1 Night Vision Goggles. The use of night-vision goggles by the operator shall be considered in the layout and light intensities of displays. Special emphasis shall be given, but not limited to, visual displays, control/display integration, controls, labeling, anthropometry, and design for maintainability, and hazard and safety criteria, as applicable.

3.21.2 Noise limits. Steady state interior noise level at each crew compartment seating position shall not exceed 85dB when tested in accordance with 4.9.108. If the steady state noise level is above 85dB with the doors, hatches, and windows closed and remedial procedures for noise suppression have been pursued to the satisfaction of the procuring activity, and permission to exceed the limit(s) is obtained, then hazard sign(s) shall be provided (see 3.22). At a minimum, each sign shall state "CAUTION High Intensity Noise Hearing Protection Required" and shall be legible from the distance indicated on the sign per MIL-STD-1474. If signs are on the outside of the vehicle they will need to specify a distance (i.e., "within 20 feet").

3.21.3 Accessibility. Compartment access and handles shall reflect compatibility with the Clothing and Personal Equipment (C/PE) of personnel using and maintaining equipment, under the environmental conditions specified herein, having space allocations commensurate with the restrictions imposed on performance by C/PE. The handles or grasp areas shall also be located to provide clearance from obstructions, and shall not interfere with operation or maintenance of the vehicle or individual component installation and removal. Proper orientation of ancillary items and components for stowage on the unit shall be made obvious, either through compartment or fixture design or by means of appropriate labels.

3.22 Safety. The vehicle shall comply with applicable OSHA 29 CFR 1910 and 1926 Regulations. Asbestos, cadmium, radioactive material, and ozone depleting chemicals shall not be used in or on the vehicle (3.2.5). Safety signs in accordance with SAE J115 shall be used where necessary. Construction shall incorporate methods to protect personnel from shock hazards, to include consideration of ground currents and voltage limits (possible arcing). Adequate safeguards shall be incorporated into the design of the vehicle and its components so that personnel shall not be exposed to concentrations of toxic or corrosive substances. Equipment that, in normal operation, exposes personnel to surface temperatures greater than 120 °F for prolonged contact or handling, or 140 °F for momentary contact, shall be appropriately guarded. Except where functionally required, exposed surfaces shall be free from burrs, sharp edges and corners, or other features that present a personnel safety hazard; or shall be shielded against contact. Danger or caution signs, labels, and markings shall be used to warn of potential or specific hazards. The sign(s) shall conform to NEMA Z 535.2, be prominently displayed on the unit, and visible from any angle of approach. The accelerator control system for the vehicle shall meet the requirement 124.1 of MIL-STD-1180.

3.22.1 Fire Safety. The contractor shall provide fire detection and extinguishing systems, including all necessary fire sensors, extinguishers, electronic controls, displays, harnesses, mounting brackets, and fasteners to protect engine and the vehicle from these fires. The space claim and weight impact on the MMPV shall be minimized to the maximum extent practicable.

3.22.1.1 Engine Compartment Fire Suppression. An automatic fire extinguishing system (AFES) shall be provided that protects the engine compartment of the MMPV from intentionally caused and rapidly-developing fires generated by flame-enhanced improvised explosive devices (IED) and other peacetime or combat threats.

a. Shall be capable of both automatic sensing and extinguishing and manual activation and override. An alarm shall sound to notify crew of system discharge.

b. Shall be compatible with the vehicle electrical system.

c. Shall be active and operable when the vehicle is running and for a minimum of 1 hour after the vehicle electrical power has been turned off.

d. Fires shall be detected and extinguished within 10 seconds of ignition.

e. Shall not contain Class I or Class II ozone depleting chemicals as specified in the Clean Air Act of 1990.

f. Refill capabilities and procedures shall be compatible with existing army recharge equipment (NSN 4210-01-474-6206, TB 9-4210-245-50). Any unique tools, fittings, or equipment shall be identified and available for Army provisioning. Any replacement/rebuild parts required to service the AFES shall be available in individual kit form.

3.22.1.2 Crew Compartment Fire Suppression. An AFES shall be provided that protects the crew compartment of the MMPV from intentionally caused and rapidly-developing fires generated by flame-enhanced IED and other peacetime or combat threats. In addition to the requirements for the Engine AFES listed above (3.22.1.1), the Crew compartment AFES shall meet the following requirements:

a. The system shall be integrated so that it does not interfere with normal or emergency ingress, egress, or operation of the vehicle with its full crew.

b. The AFES shall not discharge directly at any normal crew position. The discharge force shall not exceed 20 PSI at 5 inches from any extinguisher outlet or nozzle.

c. Compartment overpressures, agent concentrations, by-products, and oxygen levels shall be acceptable to U.S. Army Surgeon General (ref: Medical Evaluation of Non-Fragment Injury Criteria, dated September 1989).

d. Impulse noise levels during extinguisher discharge shall not exceed 140 dB at all normal positions.

3.22.1.3 Exterior Fire Suppression. A fire suppression system that protects the vehicle from external intentionally caused and rapidly-developing fires generated by flame-enhanced IED and other peacetime or combat threats is an objective.

3.22.1.4 Handheld Fire Extinguisher. The MMPV shall be provided with the means to mount the fire extinguisher listed in the BII in a location readily accessible to all crew members.

3.22.2 Backup alarm. A backup alarm conforming to SAE J994, type C shall be provided. The alarm shall be capable of being manually switched off and shall be automatically disabled when operating in the blackout mode (see 3.6.2). The backup alarm signal shall be not less than 10 dB above ambient noise levels and distinguishable from other onboard alarms.

3.22.3 Horn. An operator-controlled horn shall be furnished. The horn shall be 20 dB(A) above the vehicle operating sound level at a distance of 50 feet in front of and behind vehicle. The horn shall be inoperable under blackout conditions (see 3.6.2).

3.22.4 Whole Body Vibration. Vehicle shall not create vibrations that are harmful to the crew members during operation. Induced vibrations to the operator under all operating conditions shall be measured in accordance with SAE J1013.

3.23 Marking. The MMPV shall have marking or permanently attached data plates in accordance with MIL-STD-130 and A-A-50271. Safety and instructional markings shall not be obscured by components, from the operator's position, to include occasionally positioned levers, etc. Spillage or seepage of fluids, gaseous emissions, accumulations of grime, and areas subject to wear shall also be avoided in placement.

3.23.1 Identification. At a minimum, the data plates shall have the following information:

–Manufacturer's identification
–Manufacturer's part number
–Date of manufacture
–Serial number
–Contract number
–Item nomenclature
–Type of unit
–Military Load Class
–National stock number
–CARC/Month/Year
–Item Unique Identification (IUID) – in accordance with MIL-STD-130

All components removed or dissembled for shipment shall be individually identified and labeled for ease of replacement and proper re-assembly.

3.23.2 Safety, instructional, and component identification. Informational marking and lettering shall be flat black, centered and sized proportionate to the surface on which it is inscribed, and legible from the distance from which it is intended to be read. Plates in accordance with ANSI Z535.1 and Z535.3 may be used in lieu of, or in conjunction with, lettering. On vehicles with a camouflage pattern, markings shall be in accordance with requirements for camouflage. Lift, tiedown, and slinging provisions shall be identified, and the required tire pressure shall be inscribed above each tire as "TP (specify) LBS" in one inch black letters. Caution markings shall be in accordance with NEMA Z535.2.

3.23.3 Military load classification identification. The classification number shall be computed in accordance with STANAG 2021 and the sign shall be in accordance with STANAG 2010 for front signs.

4. VERIFICATION

4.1 Methods of verification.

4.1.1 Test. Verification shall be accomplished through systematic operation of the end item under appropriate conditions, with or without instrumentation, and the collection, analysis, and evaluation of quantitative data.

4.1.2 Analysis. Verification shall be accomplished by technical or mathematical evaluation, mathematical/computational modeling and/or simulations, algorithms, charts, and representative data.

4.1.3 Examination. Verification shall be accomplished by visual examination of the end item or its components, reviewing descriptive documentation, certifications, and comparing characteristics to established criteria.

4.1.4 Demonstration. Verification shall be accomplished by appropriate functional checks and/or operation of the end item or its components.

4.1.5 Certification. Conformance to a specific requirement or standard shall be demonstrated by a document signed by the certifying official or responsible party. When required by contract or this specification, Certifications may be used in lieu of additional verification methods and shall include supporting documentation (test data, materiel analysis, etc.).

4.2 Verification Events.

4.2.1 First Article Test. When required by contract, this test consists of a First Production Vehicle Inspection and Production Verification Test.

4.2.2 First Production Vehicle Inspection. A government inspection of the first vehicle produced under contract, usually at the place of manufacture, utilizing one or more of the verification methods referenced in paragraph. 4.1.

4.2.3 Production Verification Test. A test of the end item conducted by the government and performed at a Government test site, to establish product conformance to requirements and production capability.

4.2.4 Quality Conformance Inspection. A final inspection of the end item performed before government acceptance of a production vehicle utilizing a Final Inspection Record (FIR). The FIR is a quality record, which documents all verification actions performed on each production vehicle, both in process and final, with documented results and corrective action.

4.2.5 Control Test. When required by contract, control tests for maintaining and evaluating process control shall be conducted by the contractor. This test is performed on selected vehicles after completion of Quality Conformance Inspection.

4.2.6 Follow-on Production Test. A test of the end item, similar to Production Verification Test, but more limited in scope, to assess continued conformance to requirements and production capability.

4.3 Verification locations: Locations will be as described in the TEMP.

4.4 First Production Vehicle Inspection.

4.4.1 In-Process Inspection. During fabrication of first production vehicle, in-process inspections shall be performed by the contractor and witnessed by government representatives, to evaluate conformance to the section 3 requirements referenced in the TEMP and those items and/or processes which can not be evaluated once the end item is in its final form. In addition, evaluation of process controls and workmanship shall be made at this time. During the inspection, the contractor shall have available for review and evaluation the following records: quality manual (or appropriate document) work instructions, process procedures, inspection records, and welder certifications. When directed by the government, these inspections shall be made prior to the application of primer and paint.

4.4.2 Contractor Inspection. The first production vehicle shall be inspected by the contractor, as a minimum, to the requirements of the TEMP. Upon completion of inspection, the contractor shall submit this vehicle, and all records associated with its inspection, to the designated government element for review and/or additional verification. The government reserves the right to witness and/or participate in this inspection.

4.4.3 First Production Vehicle Disposition. When required by contract, the vehicle, which was used for First Production Vehicle Inspection, shall remain at the manufacturer facility as a manufacturing standard and shall be the last vehicle delivered on the contract.

4.5 Production Verification Test. Upon completion of First Production Vehicle Inspection, one or more production vehicles shall undergo production verification testing at a designated government approved test site to evaluate conformance to section 3 requirements as referenced in the TEMP. When required by contract, after completion of Production Verification Test, test vehicle(s) shall be updated to the approved final first article configuration. Unless otherwise stated in the contract, Production Verification Test, test vehicles will be operated in accordance with the test profile below:

TABLE I

%	TERRAIN	MAX SAFE SPEED UP TO	TOTAL MILES	MILES (PER INTERVAL)
45	Primary Road	Sustained convoy speed	6000	2700
39	Secondary Road	45 mph		2340
8	Cross Country (Trail) – Level	25 mph		480
8	Cross Country (Trail) – Hilly	15 mph		480

4.6 Quality Conformance Inspection (QCI). Each vehicle produced shall undergo a complete final inspection by the contractor to the degree necessary to assure a defect free product. This inspection shall include those section 3 requirements as referenced in the TEMP. The QCI shall be conducted and documented using a contractor prepared and government approved FIR. A complete copy of the FIR shall be submitted to the Government with each vehicle offered for acceptance.

4.6.1 Track/Route (T/R) Test. Transmission, engine oil, radiator fluid, power steering fluid, and hydraulic brake fluid levels shall be checked and adjusted if necessary before the test. Before, during and after the test, all vehicle-equipped gages and instrumentation shall be monitored for proper operations and readings. The test route length shall be as directed by the contract. The test route shall be hard surfaced and relatively level track/route and shall allow the vehicle to complete the following series of tests:

a. Start and stop the engine not less than five times.

b. Make at least five abrupt stops, from a speed not less than 25 mph, using the service brakes.

c. Maneuver at least two times through a figure-eight steering course in either direction, at maximum safe speed.

d. Release and reapply the parking brake not less than five times.

e. The vehicle shall be operated to verify that the transmission transfer case operates properly.

f. The vehicle shall also be driven in reverse for a distance of not less than 50 feet.

The test T/R shall be capable of allowing the test vehicles to operate at a minimum of 55 mph. During the T/R test, the contractor shall verify that the vehicle successfully shifts through all forward transmission shift points. The T/R test shall also facilitate speeds up to maximum governed speed. At the completion of accumulated time or miles, the vehicle shall be stopped and the engine allowed to idle for not less than 5 minutes. At this time a walk-around inspection shall be performed. Transmission, engine oil, radiator fluid, power steering fluid, and hydraulic brake fluid levels shall be re-checked. Failure to operate as prescribed herein; evidence of any deficiency, malfunction, or leakage, the need for service of any component; or loose, disassembled, or broken items that reduce the required vehicle capability shall constitute failure of T/R test.

4.6.2 Final Inspection of Production Vehicle. Each vehicle shall be completely inspected by the contractor for the characteristics/defects listed in Table II and the FIR, as a minimum.

4.6.2.1 Unclassified Defects. All defects that have no effect on function, safety, interchangeability, or life, but that are considered departures from good workmanship, will be noted in

writing. Workmanship deficiencies falling within this category, and recurring in five consecutive vehicles, will be added to the minor defects classification list.

4.6.2.2 Recurring Major Deficiencies. A major deficiency (see 6.7.13) is recurring when the same defect occurs in two successive samples. A major defect may be considered recurring when the historical inspection records ("P" chart or Government approved equivalent) reflect such a condition. Recurring major deficiencies shall be cause for all vehicles to be inspected for the recurring deficiencies to the extent the Government deems necessary. The deficiencies shall be corrected at no cost to the Government by the contractor prior to acceptance by the Government.

4.6.2.3 Recurring Minor Deficiencies. A minor deficiency (see 6.7.13) is recurring if it occurs in four successive vehicles. Recurring minor deficiencies shall be cause for all vehicles to be inspected for the recurring deficiencies, and correction shall be accomplished at no cost to the Government prior to acceptance by the Government.

TABLE II – Classification of Defects

Defect No.	Defect Characteristic	Method of Inspection
	MAJOR	
101	Steering mechanism: malfunction, unusual noise, leak.	Visual, functional
102	Engine: malfunction, unusual noise, leaks, improper installation, low oil level.	Visual, functional
103	Transmission: malfunction, unusual noise, improper shifting, leak.	Visual, functional
104	Drivetrain: malfunction, misalignment, unusual noise, overloaded.	Visual, functional
105	Transfer case assembly: malfunction, improper clearance, leaks, improper installation.	Visual, functional
106	Cooling system and components: malfunction, unusual noise, leaks, improper installation.	Visual, functional
107	Electrical system and components: malfunction, improper voltage and/or amperage	Visual, functional
108	Service, parking brakes: malfunction, unusual noise, pulling to one-side, leaks.	Visual, functional
109	Tires, wheels: damage, not properly inflated, overloaded for payload and speed	Visual, gage
110	Lubrication system components (engine): damage, leakage, improper lubrication, cleanliness.	Visual, functional
111	Fuel tanks and system: welding defects, leakage, cleanliness.	Visual, functional
112	Exhaust system: damage, leaks, excessive noise, improper installation.	Visual, functional
113	Suspension system: malfunction.	Visual, functional
114	Winch and wire rope: malfunction, improper size, damage.	Visual, functional
115	Instrumentation switches: malfunction, location, damage.	Visual, functional
116	Nuclear, biological, chemical: storage mounting provisions.	Visual
117	Weld defects: improper welds.	Visual
118	Glass: not clear, water white or untinted	Visual, functional
119	Vehicle cannot produce power for all communications equipment and electronic countermeasures	Visual, functional
120	Weapon mount cannot fully rotate freely, gunner platform not adjustable	Functional
	MINOR	
201	Coolant: low or improper mixture.	Visual, hydrometer
202	Lubricants: levels and proper types.	Visual
203	Gages and controls: malfunction, adjustments, damage.	Visual, functional
204	Wheels and tires: improper size, type and mounting.	Visual
205	Pulleys and fans: misalignment, improper clearance.	Visual
206	Bolts: defective, loose.	Visual, torque wrench
207	Wiring or tubing: defective, improper assembly or installation, improper protection, improper identification.	Visual
208	Body, doors, access covers, tiedowns, lifting device: improper fit, defective weldment, inadequate seals.	Visual, functional
209	Paint: application, improper color, camouflage pattern, coverage, corrosion.	Visual
210	Lube fittings: defective, missing, improperly installed.	Visual
211	Seats: improper fit, seatbelts not accessible.	Visual
212	Decals, marking, data and instruction plates: incomplete data, missing, improper location or size.	Visual
213	Batteries: malfunction, cracks, improper installation.	Visual, functional
214	Radio Brackets/Connectors: improper installation.	Visual
215	Lights (white and military blackout): improper installation, cracked lenses, malfunction.	Visual, functional
216	Air compressor/pneumatics: improper installation, malfunction, insufficient hose, low pressure, and leaks.	Visual, functional
217	Windows: cracked glass, improper installation, leaks.	Visual, functional
218	Air Transportability: malfunction, leaks-hydraulic/pneumatics, fluid level, improper installation.	Visual, functional
219	Windshield Washers: inoperative, fluid quantity, fluid level.	Visual, functional
220	All other components/characteristics, as required.	Visual, functional

4.7 Control Test. To demonstrate continuous control of the manufacturing operation, Control Tests shall be conducted by the Contractor at the manufacturing facility. The Government shall select one vehicle at random for a control test from each two (2) week's production quantity. The Contractor shall conduct all tests referenced in the TEMP at GVW payload. Payload shall be actual or simulated. The test vehicle shall be operated for a minimum of 100 miles on a hard surface road. After the road test the vehicle shall be examined for leaks, damage, cracks, and permanent set. The Government may elect to witness and participate in any or all testing.

4.7.1 Failure of Control Test. If the vehicle selected fails to pass any of the control tests, the Government shall stop acceptance examination and testing on subsequent vehicles until such time as conditions causing the failure have been remedied. Any defects found during, or as a result of the test, shall be prima facie evidence that vehicles accepted subsequent to the previously acceptable control tests were similarly defective, until the Government is furnished evidence by the contractor that they are not similarly deficient. Such defects on all vehicles shall be corrected by the contractor at no cost to the Government. Another vehicle with corrective actions implemented shall be subjected to the control test to verify effectiveness of corrective actions.

4.8 Follow-on Production Test (FPT). When required by contract, one production vehicle shall undergo follow-on production testing at a designated government approved test site to evaluate continued conformance to section 3 requirements as referenced in the TEMP.

4.8.1 Test deficiencies. Deficiencies during, or as a result of the FPT, may be cause for rejection of subsequent produced vehicles, until the contractor has provided evidence that corrective action has been taken to eliminate the deficiency. Any deficiency found during, or as a result of the FPT, shall be prima facie evidence that all vehicles currently or subsequently produced are similarly deficient, unless evidence satisfactory to the contracting officer is furnished by the contractor that they are not similarly deficient. The contractor shall correct such deficiencies on all vehicles at no cost to the Government. All corrective actions carried out as a result of the deficiencies found during or as a result of FPT may be successfully demonstrated during a full retest to the portion of the TEMP as directed by the Government.

4.9 Method of Examination and Test. The examinations and tests described herein are the minimum required to determine conformance to the requirements of Section 3. Additional examinations and tests by the contractor may be required to determine conformance to specification requirements. The Government reserves the authority to conduct the inspections/tests described in paragraph 4.9 (inclusive), and additional inspections/tests at the discretion of the Government to determine conformance of end items or components to specification requirements. Unless otherwise specified, all inspections shall be performed with vehicle(s) at maximum GVW.

4.9.1 Compliance. The contractor shall provide Documentation showing how the MMPV meets FMCSR or FMVSS requirements to the extent they are applicable to this vehicle purchase description.

4.9.2 Materials. To determine conformance to 3.2.1, 3.2.2, and 3.2.3, the contractor shall provide the government with certification(s) and test results that the materials meet the specified requirements. The Government, during the course of the contract, reserves the right to review contractor's purchase orders, materials, and certifications to determine if the material specifications and quality conform to the specified standard publications.

4.9.3 Corrosion prevention and control. To determine conformance to 3.2.4 the vehicle corrosion prevention design will be evaluated by conducting, at the Government's option, a Government-approved accelerated corrosion durability test at an approved Government test site.

4.9.4 Hazardous Materials. The contractor shall provide certification of conformance to 3.2.5. EPA and OSHA certifications of the manufacturing processes and facilities (contractor and subcontractor) are required before the Start of Work meeting. The Government, during the course of the contract, reserves the right to review contractor's purchase orders, materials, and certifications to determine ongoing conformance to 3.2.5.

4.9.5 Finish. To determine conformance with 3.2.6, the vehicle shall be checked for proper application of paint in accordance with MIL-DTL-53072. After application of the final coat of paint, the surface shall be checked for smoothness and non-structrual surfaces visible during normal operations shall be free of grit, seeds, streaks, runs, sags, wrinkles, pinholes, craters, and nonconformity of specified colors. During production, the contractor shall have documented methods and instructions for In-Process Inspection, to verify cleaning, pre-treating, primer application, and top coat application procedures that conform to the referenced drawing requirements.

4.9.6 Camouflage. To determine conformance to 3.2.6.1, the vehicle shall be checked for the required three-color camouflage pattern approved by the Government.

4.9.7 Configuration. To determine conformance to 3.3, the contractor shall provide the government with relevant certification(s) and test results that the vehicle meet the specified requirements.

4.9.8 Components and Ratings. To determine the conformance to 3.4, the prime contractor shall provide certified system component ratings and design applications on all components to be incorporated into the vehicle in accordance with the solicitation or contract.

4.9.9 Engine. To determine conformance to 3.4.1, the engines shall be checked for malfunction/leaking of coolant, lubricants, and fuel. The engine shall be examined for completeness, proper installation in vehicle, electrical hookups, fuel and air line connections, mechanical control hookups, oil level, fuel consumption, and cooling fluid hookups. The contractor shall certify that the engine has passed the NATO 400-hour standard engine test, AEP-5, and meets performance specifications. If the contractor and engine manufacturer certify the engine has passed commercial tests more strenuous than the NATO 400-hour standard engine test, the NATO 400-hour test certification will not be required, however a copy of the test procedure used to certify the engine will be provided with the certification. The engines shall be in accordance with SAE J1349 when tested. Engines shall demonstrate the ability to operate on all fuels specified in 3.4.1. National Security Exemption documentation if applicable, shall be provided at the Start of Work meeting.

4.9.10 Engine air intake. To determine conformance to 3.4.1.1, the air cleaner system shall be checked for proper installation and for proper configuration type (heavy-duty, dry-type). The contractor shall certify that the air cleaner element meets the 200 hour laboratory service life requirements when tested per MIL-PRF-62048.

4.9.11 Dusty Conditions. If the contractor and air cleaner manufacturer certify that the air cleaner, without a kit, conforms to 3.4.1.2 and has passed testing in accordance with MIL-PRF-62048 with Arizona Test Dust (ISO 12103-1 A1), test results shall be provided.

4.9.12 Cooling system. To determine conformance to 3.4.2, the cooling system shall be tested to assure the vehicle meets cooling system requirements. The cooling system shall be tested for maintaining the specified component operating temperatures within the specified limits while operating continuously at full load and 0.6 tractive effort to gross vehicle weight ratio (TE/GVW) while under the maximum conditions of 135°F. Test shall be conducted in accordance with TOP 2-2-607 Change 1. During testing, the cooling system must not exceed temperature limits while operating at rated engine power. The cooling

system shall be tested and must meet the above requirements after a drawdown of 10% of engine coolant. During cooling system testing, the capability of retention and recovery or expansion reserve capacity shall be checked to the specified requirements. Test reports and material certifications shall be made available to the Government verifying coolant system hoses are silicon type and meet the requirements of A-A-52426. The cooling system shall be checked periodically during testing at a Government proving ground for leakage (no leaks are allowed).

4.9.13 Lubricating Oil(s). To determine conformance to 3.4.3 the vehicle shall be checked for proper lubricant levels in accordance with the lubrication data plate. Contractor shall demonstrate compatibility with specified lubricants.

4.9.14 Fuel tanks. The fuel tank(s) shall be checked to verify that only 95% filling capacity is allowed. During PVT and FPT the vehicle shall also be tested for proper operation with 10% (approximation) fuel remaining. During inspection(s) and testing, compliance with the requirements of 3.4.4 will be determined. The contractor shall certify that the fuel tanks are corrosion resistant and the safety venting system and pressure resistance meets FMCSR 393.67(F).

4.9.15 Fuel and water separator. To determine conformance to 3.4.4.1, the contractor shall certify that the fuel system conforms to the requirements of FMCSR, para 393.65, subpart E. The fuel system shall be checked for leakage, location of fuel lines, and the use of a fuel/water separator in the fuel lines.

4.9.16 Exhaust system. To determine conformance to 3.4.5, the contractor shall certify that the vehicle exhaust system conforms to the requirements of FMCSR 393.83. The vehicle shall be checked for proper installation of exhaust system components to preclude exhaust leaks and heat damage. In addition the vehicle shall be checked for stainless steel construction of exhaust mufflers and tail pipes. The contractor shall also certify that the design of mounting brackets and fasteners protects against dissimilar metal corrosion.

4.9.17 Transmission. To determine conformance to 3.4.6, the transmission shall be checked for proper type (automatic as defined in SAE J645) and smooth operation/shifting in all gears including reverse. During vehicle road tests, the transmission downshift inhibitor system or automatic system shall be checked for proper operation during each forward gear. The transmission shall be checked for proper installation, oil leaks, and excessive heat during vehicle operation. The contractor shall certify that the transmission conforms to requirement 102 of MIL-STD-1180. During testing at a Government proving ground, all transmission control system requirements shall be tested or checked.

4.9.18 Electrical system. To determine conformance to 3.5, the vehicle electrical system during First Production Vehicle Inspection the electrical system shall be tested in accordance to the test methods stated in MIL-STD-1275 in addition to other examinations/tests as required to insure adherence to MIL-STD-1275. The ripple (spikes and surges) tests specified in MIL-STD-1275 shall be conducted simultaneously with a cracking level test. Testing results shall meet the requirements stated in the "Detailed Requirements" of MIL-STD-1275. The contractor shall certify the vehicle electrically meets the requirements of FMCSR 393.27 through System 393.33.

4.9.19 Circuits. The circuits shall be tested to verify conformance 3.5.1 and to MIL-STD-1275.

4.9.20 Master Electrical Power Switch. To determine conformance to 3.5.1.1 the master electrical power switch shall demonstrate that the operator can shut off all battery power to the vehicle and turn off the engine before disconnecting electrical power.

4.9.21 Battery Disconnect. Compliance with 3.5.1.2 shall be verified by operating the disconnect switch when the vehicle's ignition is powered off. The ignition shall then be turned on and after 30 seconds there shall be no indication of any device having electrical power.

4.9.22 Starter. To determine conformance with 3.5.1.3, during Quality Conformance Inspection, starter re-engagement and restart requirements shall be tested, and starter shall be inspected to verify proper sealing/venting.

4.9.23 Robot Charging. Compliance with 3.5.1.4 shall be demonstrated during First Production Vehicle Inspection.

4.9.24 Electrical System Capacity. Compliance with 3.5.2 shall be demonstrated during First Production Vehicle Inspection.

4.9.25 Alternator/Regulator. Compliance with 3.5.2.1 shall be demonstrated during First Production Vehicle Inspection.

4.9.26 Slaving components and Trailer Connector. To determine conformance to 3.5.3 and 3.5.4, vehicle shall be checked for installation and function of trailer connections. Receptacles shall be checked for conformance to STANAG 4007 and STANAG 4074. All connectors shall be examined for waterproof design specified. During tests at Government proving grounds (see Table II), the vehicle shall be tested for jump start capability with the slave cable and an outside power source.

4.9.27 Ignition Switch. To determine conformance to 3.5.5, the vehicle ignition switch shall be tested to assure that no damage occurs to any radio/communication device or any other electrical/electronic accessory that draws power through the vehicle's power distribution system. Vehicle ignition switch shall be tested for transmission of sufficient power from the vehicle's batteries to the starter during ignition switch activation to start the vehicle under all climatic conditions.

4.9.28 Electrical Outlets. To determine conformance to 3.5.6, the vehicle shall be checked for the required outlets on the interior and exterior of the vehicle.

4.9.29 External Shore Power. Compliance with 3.5.6.1 shall be demonstrated during First Production Vehicle Inspection.

4.9.30 Lighting. To determine conformance to 3.6, the vehicle lighting system shall be checked for proper operation, installation of the lights and equipment specified, in accordance with applicable referenced standards. During the First Production Vehicle Inspection, the contractor shall certify compliance to FMVSS 108, except for the items in conflict with 3.6.1 – 3.6.6.

4.9.31 Headlights. To determine conformance to 3.6.1, the contractor shall provide documentation (either commercial literature or test data) that the provided headlights meet the requirements of 108 and MIL-STD-180, SAE J578 and SAE J1383.

4.9.32 Blackout lights and Crew lighting. To determine conformance to 3.6.2 and 3.6.3, vehicle blackout lighting shall be subjected to tests to validate the stated requirements.

4.9.33 Spotlight and Area Lighting. Compliance with 3.6.4 and 3.6.5 shall be demonstrated during First Production Vehicle Inspection.

4.9.34 Instruments. To determine conformance to 3.6.6, vehicle instruments and gauges shall be checked for compliance with the requirements specified.

4.9.35 Wiring. To determine conformance to 3.7, vehicle wiring shall be checked to SAE J1128, SAE J163, and SAE J1292; including minimum wire size.

4.9.36 Battery and Battery mounting. To determine conformance to 3.8 and 3.8.1, the contractor shall certify that the batteries conform to the requirements in SAE J537 and SAE J1127. During the Quality Conformance Inspection, the batteries, mounting, restraints, cables, and master electric power switch shall be checked for location, condition, proper installation and operation.

4.9.37 Test Equipment. To determine conformance to 3.9 – 3.9.2, during Control Tests and initial production tests (para 4.3.2), the connector assembly shall be tested to determine proper function and compatibility. The MMPV will be connected to the current U.S. Army Standard Unit Level Test Measurement and Diagnostic Equipment which is presently the MSD (Maintenance Support Device), with the auxiliary MSD-ICE (Internal Combustion Engine) test hardware. A non-destructive fault will be inserted and diagnosed to determine that the vehicle's ECM / ECU diagnostic outputs are transmitted to the vehicle mounted J1939/13 female 9 pin Deutsch connector. Failure to diagnose the system fault will constitute failure of this test. Nonconformance or failure of any component that degrades the vehicles diagnostics shall constitute failure of this test.

4.9.38 Winch. To determine conformance to 3.10, the winch and cable shall be tested for the rated pull capability specified. After testing, the winch shall be examined for damage and the cable shall be checked for fraying. During Quality Conformance Inspection, the winch shall be checked for proper assembly, installation, length of cable (at least 75 feet), clevis ends, and shall be tested by pulling a like vehicle on a hard level surface. All hydraulic pressure adjustments shall be inspected and recorded prior to vehicle shipment. The winch shall be checked for the proper information specified on the winch nameplate in accordance with SAE J706. The contractor shall certify that the winch meets the "General Specification" requirements contained in SAE J706. In addition, the certification shall include adherence to the maximum continuous rating and the overload requirement. The certification shall allow the user to immediately use the winch without additional testing upon fielding. The contractor shall assure that the winch cable is properly wound, free of corrosion, bird nesting, twist, kinks and other defects caused by an improperly spooled cable.

4.9.39 Vehicle hull or Chassis. To determine conformance to 3.11, the contractor shall provide the government with certification(s) and test results that the vehicle hull or chassis meets the specified requirements. The Government, during the course of the contract, reserves the right to review contractor's purchase orders, materials, and certifications to determine if the vehicle hull or chassis's material and quality conform to the specified standard publications.

4.9.40 Axles and Suspension. To determine conformance to 3.11.1 and 3.11.3, the vehicle suspension and axles shall be checked for proper mounting clearance, lubrication and alignment. The vehicle suspension shall be periodically inspected during Government Proving Ground tests to detect any overstress condition.

4.9.41 Torque limiting differentials. To determine conformance to 3.11.2, the differential shall be checked for proper installation, leaks and excessive heat during operation.

4.9.42 Tires, Wheels and Run-flats. To determine conformance to 3.11.4, the vehicle's wheels, rims, and tires shall be checked for proper type ratings specified. The tires shall be checked for condition, lug nut torque, proper tire pressure, location of tire pressure stencil markings and adequate clearance. Lug

nuts shall be checked for commonality across all wheels. Operational requirements shall be demonstrated at Government proving ground. The contractor shall certify that the rim and tire ratings conform to FMVSS 119, 120, and SAE J2014.

4.9.43 Wheel Splash and Stone Throw Protection. To determine conformance to 3.11.5, vehicle fenders and inner splash shields shall be checked for specified chain clearance and for maximum practical protection of engine and under hood and under vehicle components from debris. Rear wheel splash and stone throw protection shall be checked for conformance to SAE J682.

4.9.44 Service brakes. To determine conformance to 3.11.6, the vehicle brake system shall be checked for proper location, assembly and configuration of the brake system. Prior to the Start of Work meeting, the contractor shall certify that the brake linings are constructed from non-asbestos materials and the vehicle is in accordance with FMVSS 121.

4.9.45 Air system. Contractor shall perform tests on the air system to verify conformance to SAE J10 and SAE J318 and the performance requirements specified in 3.11.6.1.

4.9.46 Trailer brake provisions. Contractor shall verify conformance to 3.11.6.2.

4.9.47 Increased braking ability. Contractor shall verify and demonstrate conformity to 3.11.6.3.

4.9.48 Parking brake. To determine conformance to 3.11.6.4, a vehicle shall be tested on the specified slope, in both an upgrade and downgrade position, with the parking brakes set. The engine shall be operated a minimum of two minutes, and a minimum of one minute with the engine shutdown, in each test position (upgrade and downgrade). There shall be no evidence of slipping during the test. The test shall be conducted on a dry, hard surface slope that is free from loose material. In addition, the proper parking brake application shall be demonstrated (i.e. spring action, or other energy). During testing, the parking brake light shall be checked for presence and proper operation, as specified.

4.9.49 Crew compartment. Contractor shall demonstrate conformance to 3.12.

4.9.50 Seating. Contractor shall provide certification and test data that the vehicle seating meets FMVSS 207, 209, 210, and 302 and conforms to 3.12.1 – 3.12.1.1. The seating and seatbelts shall be inspected and tested during Government Proving Ground tests to determine mitigation of blast impact to occupants, ability to accommodate a 5th percentile female through a 95th percentile male military personnel in full battle gear.

4.9.51 Glass. Contractor shall provide certification and test data that all automotive glass meets requirements of 3.12.2. Glass performance shall be inspected and verified in Government Proving Ground tests.

4.9.52 Ventilation System. The vehicle shall be tested for conformance to 3.12.3; for operating effectiveness, efficiency, ease of service, and a complete change of air in accordance with MIL-STD-1472 during testing at a Government Proving Ground.

4.9.53 Ingress/Egress Points. Contractor shall demonstrate conformance to 3.12.4.

4.9.54 Robot Ingress/Egress. Contractor shall provide modeling and simulation data to demonstrate conformance to 3.12.4.1, which shall be inspected and verified during testing at Government Proving Grounds tests.

4.9.55 Storage. Contractor shall demonstrate conformance to 3.12.5, which shall be inspected and verified during testing at a Government Proving Grounds.

4.9.56 Non-skid surfaces. Contractor shall demonstrate conformance to 3.12.6, which shall be inspected during testing FPVI and QCI

4.9.57 Gauges and instruments. To determine conformance to 3.12.7, vehicle instruments and gauges shall be checked for compliance with the requirements specified.

4.9.58 Vehicle accessories. To determine conformance to 3.12.8, the chassis equipment specified shall be checked for proper installation and function.

4.9.59 Mounting of Communications and Electronic Countermeasures. To determine conformance to 3.12.9, the specified equipment will be installed to assure power source and mounting are available for operation of the equipment.

4.9.60 Fold-down computer terminal. Provisions for the computer terminal described in 3.12.9.1 shall be inspected to determine conformance to requirements.

4.9.61 Rifle mounting provisions. To determine conformance to 3.12.10, the rifle mount racks shall be checked for capability to hold four M16A1, M16A2, or M4 rifles, and to determine whether locations hinder operation of the vehicle.

4.9.62 Weapon station. To determine conformance to 3.12.11, the vehicle weapon station shall be installed and inspected. During tests at a Government proving ground, the mounting structure shall not show any evidence of degradation, with a machine gun mounted on the vehicle for Production Verification Test. At the midpoint of the testing, and at the end of the testing, the machine gun mounted on the vehicle shall fire 200continuous rounds from the weapon, with no degradation to the structure or any other portion of the vehicle. Any degradation to any component of the vehicle shall be cause for rejection.

4.9.63 Ancillaries. To determine conformance to 3.12.12, BII equipment, as well as any hand tools or other equipment required to perform operator/crew level maintenance procedures that are not specified shall be checked for proper installation and function.

4.9.64 Towing and recovery provisions. To determine conformance to 3.12.13, the pintle shall be tested during testing at a Government proving ground for the requirements specified.

4.9.65 Automotive performance characteristics. Contractor shall demonstrate conformance to 3.13, which shall be inspected and verified during testing at a Government Proving Grounds.

4.9.66 Operability. Contractor shall demonstrate conformance to 3.13.1, which shall be inspected and verified during testing at a Government Proving Grounds.

4.9.67 Mobility. The MMPV will be modeled to determine compliance to 3.13.2, results shall be verified during testing at Government Proving Grounds.

4.9.68 Payload. The vehicle shall be tested during PVT to determine conformance to 3.13.2.1

4.9.69 Range. To determine conformance to 3.13.2.2, the vehicle with rated payload shall be operated at the speed specified on integral fuel tanks.

4.9.70 Sustained Convoy Speed. To determine conformance to 3.13.2.3, the vehicle shall be tested in accordance with TOP 2-2-602 paragraph 5.2.1 and TOP 2-2-610 paragraph 5.1.3.1 for achieving and maintaining the specified speeds. Test shall be conducted with the engine fan blocked on. If vehicle fails to achieve compliance with engine fan blocked on, a second test shall be conducted with the engine fan operating normally. Attainment of the minimum grade speeds listed in 3.13.2.5 during either test run shall demonstrate compliance with the requirement.

4.9.71 Acceleration. To determine conformance to 3.13.2.4, the vehicle shall be tested in accordance with TOP 2-2-602 at rated payload.

4.9.72 Gradeability and Stability. To determine conformance to 3.13.2.5-6, the vehicle shall be tested in accordance with TOP 2-2-610 at rated payload.

4.9.73 Fording. To determine conformance to 3.13.2.7, the vehicle shall be operated without preparation, in 30 inches of fresh or salt water, for at least 15 minutes. Fording for a period of 15 minutes shall not cause engine stall, degradation to vehicle components, need for maintenance actions, nor render the vehicle incapable of performing any operation of this specification. While fording, the engine shall be capable of being restarted when stopped for up to 10 minutes. Seals shall restrict the entrance of foreign matter into bearings, which are exposed to contamination during these operations. Water contamination of bearing lubricants shall not be more than 2.0% by volume. All bearing seals shall restrict the leaking of lubricants from the bearings. Immediately following the fording test, the wheel hubs shall be removed and examined for water or water born contamination. Fluid samples shall be taken from the engine, brake fluid, transmission, power steering pump, fuel tank(s) and all differentials. Water contamination in excess of 2% by volume from before test samples shall be cause for rejection.

4.9.74 Braking. To determine conformance to 3.13.2.8, service brakes shall be tested for the ability to control and hold the vehicle at GVW, on the maximum specified grade in ascending and descending positions for FPVI, PVT, CT, and FPT inspections and at VCW for QCI testing.. Service brakes shall stop the vehicle as specified in FMVSS 121 for the weight/class of the vehicle. Tests shall be conducted on a dry, hard, approximately level, road surface that is free from loose material. The results of a minimum of three consecutive stopping distances shall be averaged to determine adherence to stopping requirements. During braking tests, the vehicle shall be monitored for excessive pulling to the left or right. Brake light activation and brake light override of emergency flashers shall be checked. During Production Verification Tests and Follow-on Production Tests the vehicle shall be tested according to TOP 2-2-608 for conformance to the test criteria specified therein. All brake testing shall be conducted without the use of engine or transmission retarders.

4.9.75 Turning performance. To determine conformance to 3.13.2.9, the vehicle shall be tested for its minimum constant wall-to-wall diameter in both directions with no adjustments of turning stops between directions.

4.9.76 Towing. To determine conformance to 3.13.2.10, the vehicle, at a government proving ground, shall demonstrate towing and being towed capabilities as specified.

4.9.77 Interface requirements and Dimensions. To determine conformance to 3.14 – 3.14.1, the vehicle shall be tested for the specified transportability requirements set forth in MIL-STD-209, MIL-HDBK-1791 and MIL-STD-1366. The vehicle shall be checked for adequacy of tiedowns, lifting eyes, instructions for component removal when required for all modes of transport.

4.9.78 Transportability. To determine conformance to 3.14.2, a vehicle shall be prepared for shipment to verify the times required. Vehicle loading shall be conducted in accordance with the requirements and preparation times specified. The vehicle shall be checked for meeting the requirements of MIL-HDBK-1791 for air transport by various aircraft.

4.9.79 Slinging and Tiedown provisions. To determine conformance to 3.14.2.1, the contractor shall certify that slinging and tiedowns meet the General Requirements (para 4) and Detailed Requirements (para 5) of MIL-STD-209. During Government testing, slinging and tiedown provisions shall be tested to insure the provisions, including the connecting structural members, meet the requirements of MIL-STD-209 and MIL-HDBK-1791.

4.9.80 Rail Transportability. To determine the conformance to 3.14.2.3, the vehicle shall be subjected to military standard rail impact test in accordance with MIL-STD-810. Prior to the rail impact test, the vehicle shall have been tested to the performance requirements specified in this specification. The vehicle shall be inspected before and after the rail impact test to check for spillage of lubricants, structural damage, and electrical shorts. Performance degradation is considered a deficiency.

4.9.81 Marine Transportability. Contractor shall demonstrate conformance to 3.14.2.4.

4.9.82 Environmental parameters. To determine conformance to 3.16 – 3.16.2, the vehicle shall be tested at the stated temperature ranges for a period of not less than 24 hours per range specified. During testing, the vehicle shall be started and operated at least until the vehicle can be safely shut down without external power sources. As a minimum, the following equipment shall be operated to determine proper operation: Engine, Transmission and Drivetrain Components (inclusive); Winch; Electrical, including Lights; Cooling System; Instruments/Controls.

4.9.83 Rain. The MMPV shall be placed in an environmental control test facility simulating falling rain at a rate not less than 4 in/hr and a wind velocity greater than 30 mph. The chamber temperature need not be controlled but the water temperature shall be maintained at 10 °F less than that of the MMPV interior. The MMPV shall be checked for water intrusion, internally, then started. Failure to operate as prescribed herein, nonconformance to 3.16.3 or 3.4.5, or any accumulation of water greater than 0.15 ounce shall constitute failure of this test.

4.9.84 Fungus. Contractor shall provide certifications that materials used in the construction of the MMPV are fungus inert or have been treated to prevent fungal growth.

4.9.85 Sand/Dust. The MMPV will be tested in accordance with Method 510.4 “Sand and Dust” from MIL-STD-810F for conformance to 3.16.5.

4.9.86 Electromagnetic Environmental Effects (E3). To determine conformance to 3.16.6 (inclusive of all subparagraphs), the vehicle shall be tested to validate the stated requirements, in a series of Government conducted PQT test events (i.e. EMC, Inter-system EMC, HEMP).

4.9.87 Intra-system Electromagnetic Compatibility (EMC). To determine conformance to 3.16.6.1 and 3.16.6.2, the vehicle and components shall be subjected to tests in accordance with MIL-STD-461E.

4.9.88 High-altitude EMP (HEMP). To determine conformance to 3.16.6.3, the vehicle electrical system component's protection against HAEMP shall be subjected to test levels of MIL-STD-2169.

4.9.89 Sustainment parameters. Contractor shall demonstrate objective components listed in 3.17.

4.9.90 Maintainability. To determine conformance to 3.17.1 and 3.17.4, a Maintenance Ratio (MR) of less than, or equal to, that specified in paragraph 3.17.4, must be demonstrated during PVT. The MR will be calculated using the total cumulative maintenance man-hours, scheduled and unscheduled, divided by the miles. Maintenance induced errors, crew errors and operator/crew inspection times are to be excluded.

4.9.91 Compatibility. Contractor shall demonstrate conformance to 3.17.2.

4.9.92 Ease of maintenance. Contractor shall demonstrate conformance to 3.17.3.

4.9.93 Reliability, Availability, and Maintainability (RAM). A reliability verification of the vehicle(s) test performance shall be conducted during Government conducted PVT to verify that the Mean Miles Between Hardware System Abort – Mobility requirements, as specified in 3.17.4 and shown in Table I, will be generated, utilizing test data (i.e., Test Incident Reports). The contractor's utilization of "reliability best practices" such as Physics-based Modeling & Simulation (M&S), laboratory component-level testing, Highly Accelerated Life Testing (HALT), Environmental Stress Screening (ESS), Highly Accelerated Stress Screening, Progressive Assurance (RAM Case), and the establishment of a Reliability Development Growth Test (RDGT) are encouraged since they have been shown to increase the likelihood of test success. The usage of such techniques and shall be reviewed. Where possible data from contractor conducted tests and reliability best practices will be used to verify conformance with this requirement.

4.9.94 Reparability. Contractor shall demonstrate conformance to 3.17.5.

4.9.95 Force Protection. The contractor shall demonstrate compliance to 3.18 (inclusive of all subparagraphs), results shall be verified during testing at Government Proving Grounds.

4.9.96 Electromagnetic Radiation Hazards (EMRADHAZ). The vehicle shall be tested for conformance to 3.18.1.

4.9.97 Hazards of Electromagnetic Radiation to Personnel (HERP). The vehicle shall be tested for conformance to 3.18.1.1.

4.9.98 Hazards of Electromagnetic Radiation to Fuel (HERF). The vehicle shall be tested for conformance to 3.18.1.2.

4.9.99 Initial Nuclear Weapons Effects (INWE). The vehicle shall be model and/or simulated for conformance to 3.18.1.3.

4.9.100 Nuclear, biological, and chemical (NBC) contamination. The vehicle shall be tested in accordance with STANAG 4145 and STANAG 4521 to demonstrate conformance to 3.18.2.

4.9.101 Mounting Kit, M100 Decontamination System. To determine conformance to 3.18.3, the mounting bracket location will be evaluated and coordinated between the Government and Contractor.

4.9.102 Mounting of M22 Chemical Agent Automatic Alarm. The vehicle shall be tested to demonstrate conformance to 3.18.4

4.9.103 System survivability. The contractor shall demonstrate compliance to 3.19 (inclusive of all subparagraphs), results shall be verified during testing at Government Proving Grounds.

4.9.104 Welding. To determine conformance to 3.20 all welds shall be visually inspected in accordance with Section #6 of AWS D1.1 for steel; AWS D1.2 for aluminum. For the purpose of this contract, weld quality and workmanship shall be verified by qualified inspectors trained to perform the specific functions they are assigned. Acceptable training may be based on a) current or previous certification as an AWS Certified Welding Inspector, or b) an Engineer or technician by formal training or experience, or both, in metals fabrication, inspection and testing, who is competent in the use of weld inspection techniques and equipment. Welds will be checked, at a minimum, prior to and at the completion of testing.

4.9.105 Weld joint design. Contractor shall certify that weld practices for scenarios listed in 3.20.1 are in accordance with the requirements of 3.20.1.

4.9.106 Human engineering. To determine conformance to 3.21, the vehicle shall be evaluated for soldier MOS requirements and standards specified. Conformance to requirements shall be demonstrated using a government designated driver. During all Government testing, the vehicle will be evaluated for compliance with MIL-STD-1472.

4.9.107 Night Vision Goggles. The contractor shall demonstrate compliance with 3.21.1.

4.9.108 Noise limits. To determine conformance to 3.21.2, the vehicle shall be tested for the noise requirements specified. Exterior noise test procedures shall be in accordance with SAE J366, except vehicle payload shall be 2/3 rated payload and engine exhaust brake shall not be engaged during test. Interior noise test procedures shall be in accordance with SAE J336, except: a) measurements shall be taken at the driver's and each crew member's position, b) cab ventilation fan shall be in operation at its highest speed during testing, and c) vehicle payload shall be 2/3 rated payload.

4.9.109 Accessibility. To determine conformance to 3.21.3, a test shall be conducted at a Government test site during Production Verification Testing.

4.9.110 Safety. To determine conformance to 3.22, vehicle systems and components shall be checked for safety related hazards. Vehicle shall be checked for compliance with applicable safety standards in MIL-STD-1180 (TOP 2-2-508 used as guide). Vehicle shall be checked for proper quantity and location of seat belts.

4.9.111 Fire Safety. To demonstrate conformance to 3.22.1 (inclusive of subparagraphs 3.21.1.1-4) the Contractor shall certify that fire systems installed on the vehicle have passed government testing and have integrated into the vehicle to meet the requirements as specified.

4.9.112 Backup alarm. Contractor shall certify compliance with 3.22.2.

4.9.113 Horn. Contractor shall demonstrate compliance with 3.22.3.

4.9.114 Whole Body Vibration. The vehicle shall meet the requirements of MIL-STD-1472 for whole body vibration, during testing.

4.9.115 Marking and Identification. The vehicle shall be checked to ensure that exterior markings are applied in accordance with drawing no. 12422122 for stencils, as denoted in the TDP for body peculiar stencils or nameplates. All stowed items on the vehicle shall be checked for proper

identification. To determine conformance to ID plate requirements, the vehicle shall be checked to ensure that the identification plate meets the requirements of 3.23.1 and MIL-STD-130. The ID plate shall be checked for specified attachment hardware and legibility. All markings shall be checked for adhesion, legibility, paint runs and location.

4.9.116 Safety, instructional, and component identification. Contractor shall certify and demonstrate compliance to 3.23.3.

4.9.117 Military load classification identification. To determine conformance to 3.23.3, the vehicle sign kit inspected in accordance with STANAG 2010 and 2021.

5. PACKAGING

5.1 Packaging. For acquisition purposes, the packaging requirements shall be as specified in the contract or order (see 6.2). When packaging of material is to be performed by DoD personnel, these personnel need to contact the responsible packaging activity to ascertain requisite packaging requirements. Packaging requirements are maintained by the Inventory Control Point's packaging activity within the Military Department or Defense Agency, or within the Military Department's System Command. Packaging data is available from the managing Military Department's or Defense Agency's automated packaging files, CD-ROM products, or by contacting the responsible packaging activity.

6. NOTES

(This section contains information of a general or explanatory nature, which may be helpful but is not mandatory.)

6.1 Intended use. The MMPV's are intended to be used by Clearance Company, Explosive Hazard Team, and Explosive Ordnance Disposal units to execute route and area clearance and EOD supporting missions requiring force protection.

6.2 Acquisition requirements. Acquisition documents must specify the following:

a. Title, number, and date of this specification.

b. Issue of DoDISS to be cited in the solicitation and, if required, the specific issue of individual documents referenced (see 2.2 and 2.3).

c. When a first article is required for inspection and approval, time frame for submission, and the number of units required (see 3.1).

d. Finish color requirement (see 3.2.6).

e. When a camouflage pattern is to be applied over the finish coat (see 3.2.6.1).

f. When current ARMY TMDE (SPORT or MSD) will not be supplied to the contractor (see 3.15).

g. When a SINCGARS radio set will not be supplied to the contractor (see 3.15).

h. When an NBC ensemble will not be supplied by the contractor.

i. Nomenclature, assigned weight classification number and instructions (see 3.23.3).

j. When testing facilities will be stipulated by the government (see 4.3.1).

k. Packaging requirements (see 5.1).

6.3 First article. When a first article inspection is required, each item to be tested should be a first article production unit. The sample should consist of one or more MMPV's, as specified (see 6.2). The contracting officer should include specific instructions in acquisition documents regarding arrangements for examinations, tests, approval, and disposal of the sample. Invitation for bids should provide that the Government reserves the right to waive the requirement for samples for first article inspection to those bidders offering a product that has been previously acquired or tested by the Government, and that bidders offering such products, who wish to rely on such production or test, must furnish evidence with the bid that prior Government approval is appropriate for the pending contract.

6.4 Camouflage pattern data. The contracting officer will arrange for submission of outline drawings from the contractor; and subsequently provide the contractor with pertinent data, to include camouflage pattern drawings and Data Item Descriptions, as applicable (see 3.2.6.1).

6.5 Government loaned equipment. When applicable (see 6.2), the contracting officer should arrange to furnish the contractor the property specified in 3.15.

6.6 Metric products. Products manufactured to metric dimensions will be considered on an equal basis with those manufactured using inch-pound units. They will be accepted at the contracting officer's option, providing measurements fall within specified tolerances, using the conversion tables in FED-STD-376; and all other requirements of this specification are met.

6.7 Definitions. For the purposes of this specification, these subordinate definitions apply. The use of the terms "threshold" or "shall" define a minimum contractual performance requirement. The term "objective" establishes the range or upper bound of desired performance.

6.7.1 Vehicle Weight (VW). The VW includes the weight of the vehicle with all required equipment as described herein, a full complement of fuel, lubricant, and coolant, and weight margins for these included items (as applicable). The VW also includes the crew, their personal equipment, water, communication gear, personal weapons, and any weight margins associated with these items.

6.7.2 Payload. The payload includes the weight of the mission equipment and any additional load carrying capacity beyond that.

6.7.3 Gross Vehicle Weight (GVW). The GVW includes the VW, the payload (mission equipment), and weight margins.

6.7.4 Recovered materials. Recovered materials are those materials that have been collected from solid waste and reprocessed to become a source of raw materials, as distinct from virgin raw materials.

6.7.5 Dissimilar metals. Metals are considered dissimilar when two specimens in contact with each other promote accelerated galvanic corrosion.

6.7.6 Recovery. The process of extricating a vehicle or equipment casualty from the place where it becomes disabled or defective and moving it to the first place where the crew can continue with their task, where repairs can be effected, or from where the vehicle or equipment casualty can be backloaded.

6.7.6 Interchangeable. Interchangeable parts are defined as two or more parts possessing such functional and physical characteristics as to be equivalent in performance and durability, and capable of being exchanged one for the other without alteration of the parts, of mating or adjoining parts, except for adjustment, and without selection for fit or performance.

6.7.7 Fungus-inert. A material that is not a nutrient to fungi is considered fungus-inert.

6.7.8 NBC contamination. NBC contamination is defined as the deposit, adsorption, and/or absorption of residual radioactive material or biological or chemical agents on or by structures, areas, personnel, or objects.

6.7.9 Essential Function Failure (EFF). An Essential Function Failure (EFF) is defined as an event that results in the loss of or operationally unacceptable degradation in one or more of the essential functions. Table 1 in the Failure Definition and Scoring Criteria (FDSC) describes allowable degradation in essential functions and provides additional clarifications with regard to the scoring of the loss of essential functions.

6.7.9.1 System Abort (SA). An SA is an EFF which results in the loss or degradation of an essential function(s) that renders the system unable to enter service or causes immediate removal from service, deadlines the platform, or makes it non-mission capable (a SA reduces its utility to the point that it is deemed ineffective/unsafe in its role on the battlefield). System abort also includes those events that create a personal injury related Category I (catastrophic) or II (critical) hazard as defined in MIL-STD-882D (See Table 2). By definition, all SAs are also EFFs and are annotated as "EFF/SA". An SA may result in a "Not Mission Capable" status under wartime conditions or reduces its utility to the point that it is deemed ineffective/unsafe.

6.9.7.2 System Abort-Mobility (SA-Mob). A System Abort-Mobility is an SA that affects a platform's mobility system(s) and renders the system unable to enter service or causes immediate removal from service, results in unsafe operation, deadlines the platform, or makes it non-mission capable.

6.7.10 Uncontrolled safety hazard. Uncontrolled safety hazards may be interpreted as defined in MIL-HDBK-454A, Guideline 1, Safety Design Criteria-Personnel Hazards.

6.7.11 Minor failure. A minor failure is defined as any malfunction that can be corrected within 30 minutes by adjustment, repair, or replacement using controls and on-equipment tools or parts. Please review the Failure Definition and Scoring Criteria (FDSC) for further details.

6.7.12 Major failure. A major failure is defined as any malfunction that cannot be corrected within 30 minutes by adjustment, repair, or replacement, using controls and on-equipment tools or parts, and is a malfunction that causes or may cause one or more of the following. Please review the Failure Definition and Scoring Criteria (FDSC) for further details.

a. Failure to commence operation

b. Cessation of operation

c. Degradation of performance below the designated levels

d. Damage to the system if operation is continued

e. Personnel safety hazards

6.7.13 Definitions of Recurring Major and Minor Defects. The inspector shall verify that an inspection of each vehicle is performed by the contractor. The Government inspector shall assure that all deficiencies encountered during the inspection are enumerated on the deficiency sheet for the vehicle. The defects noted on the deficiency sheet shall contain sufficient description to allow the Government inspector and the contractor's representative to classify the deficiency IAW the classification of defects of the vehicle specification and definitions contained in ANSI/ASQC Z1.4. Corrective action shall be taken for recurring deficiencies.

6.8 Identification of changes. Marginal notations are not used in this revision to identify changes with respect to the previous issue, due to the extent of the changes.

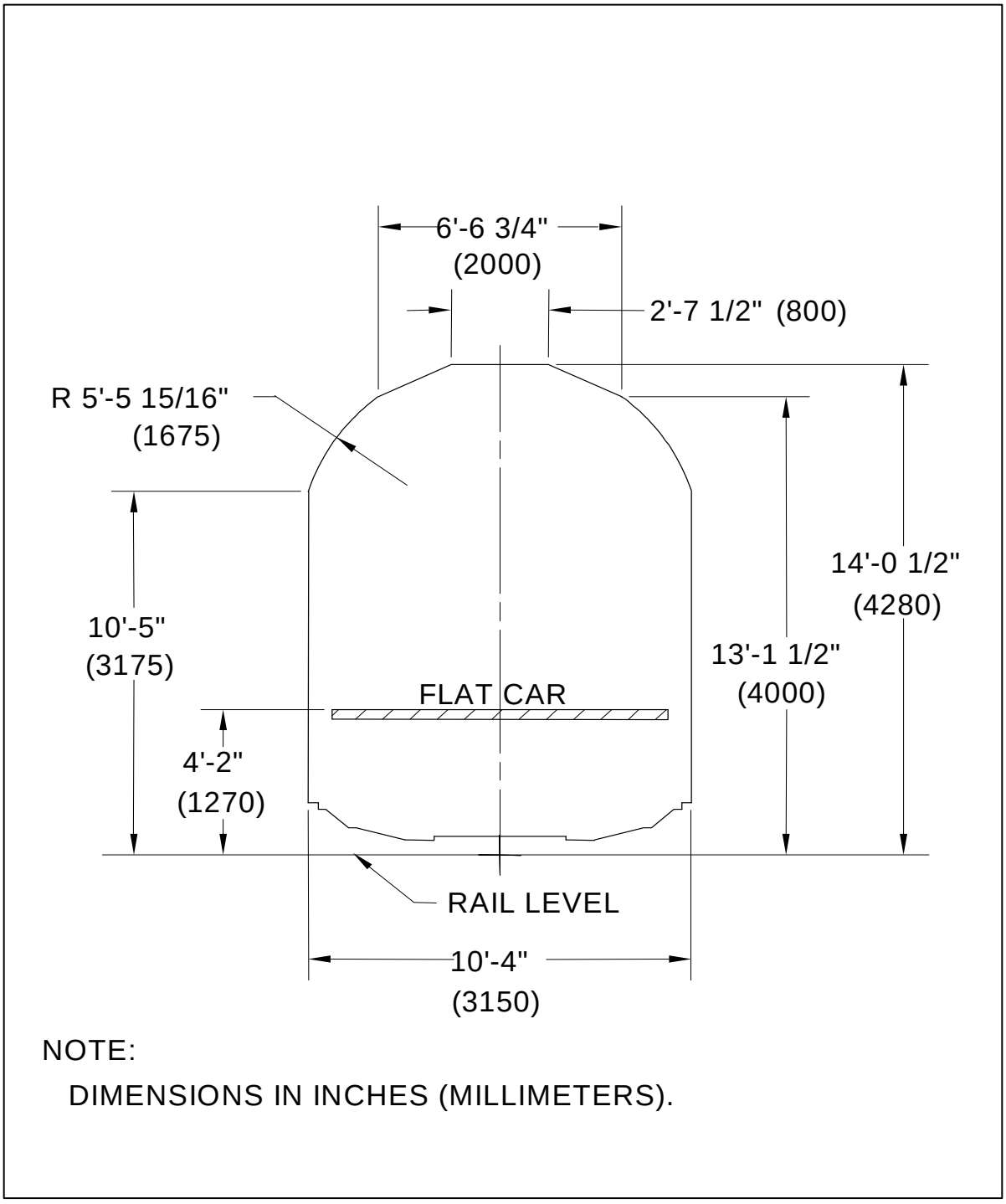

Figure 1. Gabarit International de Chargement (GIC) clearance dimensions.

Custodian:
Army-AT

Preparing activity:
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